

A Stereo-Atlas of Ostracod Shells

edited by R. H. Bate, J. W. Neale, Lesley M. Sheppard
and David J. Siveter

Volume 5, 1978

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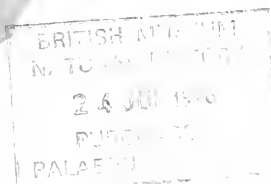
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Volume 5, Part 1; 30th June 1978

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Professor P.C. Sylvester - Bradley

It is with deep regret that the Editors of the Stereo-Atlas record the death on April 17th 1978 of Professor Peter Colley Sylvester-Bradley, the F.W. Bennett Professor of Geology, in the University of Leicester.

Professor Sylvester-Bradley was the founder of the Stereo-Atlas of Ostracod Shells and from its inception until his tragic and untimely death one of its joint editors. His unique and lovable personality, his unstinting dedication and enthusiasm to the task in hand, and his genuine concern for the lot of others was an inspiration to those fortunate to know him. The officers and publishers of the Stereo-Atlas owe a particular and immeasurable debt to Professor Sylvester-Bradley for all that he did for the journal.

BRITISH TROPICAL
NATURAL HISTORY
24 JUL 1978
PURCH. DEPT.
PALACE

ON *PTERYGOCYTHEREIS SIVETERI* ATHERSUCH sp.nov.by John Athersuch
(University of Leicester, England)*Pterygocythereis siveteri* sp. nov.

- 1868 *Cythere jonesii* (Baird) var. *ceratoptera* (Bosquet); G. S. Brady, in: *Les Fonds de la Mer*, Folin & Perier. Paris, 1, 107, pl. 14, figs. 5, 6. (*non Cythereis ceratoptera* Bosquet, 1852).
- 1894 *Cythereis jonesii* Baird; G. W. Müller, *Fauna Flora Golf. Neapel*, 21, 375, pl. 29, figs. 23, 25, pl. 31, figs. 23, 24. (*non Cythereis jonesii* Baird, 1850).
- 1975 *Pterygocythereis ceratoptera* (Bosquet); G. Bonaduce, G. Ciampo & M. Masoli, *Pubbl. Staz. zool. Napoli*, 40, suppl. 1, 53, pl. 30, figs. 1 - 9.

Holotype: British Museum (Natural History) no. 1978.59; female right valve, left valve and appendages.*Type locality*: Bay of Naples, Italy, approx. lat. 40° 40'N, long. 14° 10'E; Recent.*Derivation of name*: After my friend and colleague, Dr. David J. Siveter.*Figured specimens*: Hancock Museum specimen (juv. - 4 car.: Pl. 5, 6, fig. 2). Brit. Mus. (Nat. Hist.) specimens: 1978.57 (?♀ LV; Pl. 5, 2, fig. 1), 1978.58 (?♂ LV: Pl. 5, 2, fig. 2), 1978.59 (holotype, ♀ RV: Pl. 5, 2, fig. 3; Pl. 5, 6, figs. 3, 4; Text-figs. 1b, c, 2b - e), 1978.60 (?♀ LV: Pl. 5, 4, fig. 1), 1978.61 (?♂ LV: Pl. 5, 4, fig. 2; Pl. 5, 8, figs. 2, 4), 1978.62 (?♂ car.: Pl. 5, 4, fig. 3), 1978.63 (juv. - 1 LV: Pl. 5, 6, fig. 1), 1978.64 (?♂ LV: Pl. 5, 8, fig. 1), 1978.65 (?♂ RV: Pl. 5, 8, figs. 3, 5), 1978.66 (♂ appendages: Text-figs. 1a, d, 2a). The Hancock Museum specimen is from Kilchattan Bay, Scotland. 1978.57, 63, 65 are from Morphou Bay, NW Cyprus. 1978.58, 59, 64, 66 were collected from the Bay of Naples, Italy by Dr. G. Bonaduce. 1978.60 - 62 are from Madeira (B. M. N. H. collection).

Explanation of Plate 5, 2

Fig. 1, ?♀ LV, ext. lat. (1978.57, 929 µm long); fig. 2, ?♂ LV, ext. lat. (1978.58, 1073 µm long); fig. 3, holotype, ♀ RV, ext. lat. (1978.59, 976 µm long). Scale A (250 µm; x 58), figs. 1 - 3.

Diagnosis: Anterior margin of each valve with single row of prominent, clavellate spines; postero-dorsally, right valve bears one spine, left valve bears two. Posterior margin angular, bearing usually six spines postero-ventrally. Male copulatory appendages distinctive.*Remarks*: For over 100 years this species has been considered as either conspecific with *Cythereis ceratoptera* Bosquet, or as a sub-species or variety of *Pterygocythereis jonesii* (Baird); (See Brady, *op. cit.*; Brady, 1874, *Palaeontogr. Soc.*, (Monogr.), vol. for 1874; Brady, 1878, *Trans. zool. Soc. Lond.*, 10 (8), no. 1; Bonaduce *et al.*, *op. cit.*). Comparison of this species with *P. jonesii* (see *Stereo-Atlas of Ostracod Shells*, 1978, 5 (2), 9 - 16) and syntypes of *C. ceratoptera*, housed in the Institut Royal des Sciences Naturelle de Belgique, Brussels, leaves no doubt that it differs from both of these species in shape, in the disposition of the spines and, in the case of *P. jonesii*, in the details of the appendages.It is interesting to note that whilst *P. jonesii* has four elongate adductor muscle scars, in both *P. siveteri* and *P. ceratoptera* s. s. the uppermost adductor muscle scar is V-shaped.*P. jonesii* and *P. siveteri* are often found together in the same sample, particularly in the Mediterranean, but the species are distinct even as juveniles (c.f. Pl. 5, 6, fig. 2 and *Stereo-Atlas of Ostracod Shells*, 5 (2), Pl. 5, 14, figs. 1 - 4).Very few instars of *P. siveteri* were available for study. The smallest instar (probably - 4 instar) is highly inflated and bears small alar carinae, each of which terminates posteriorly in a short spine.

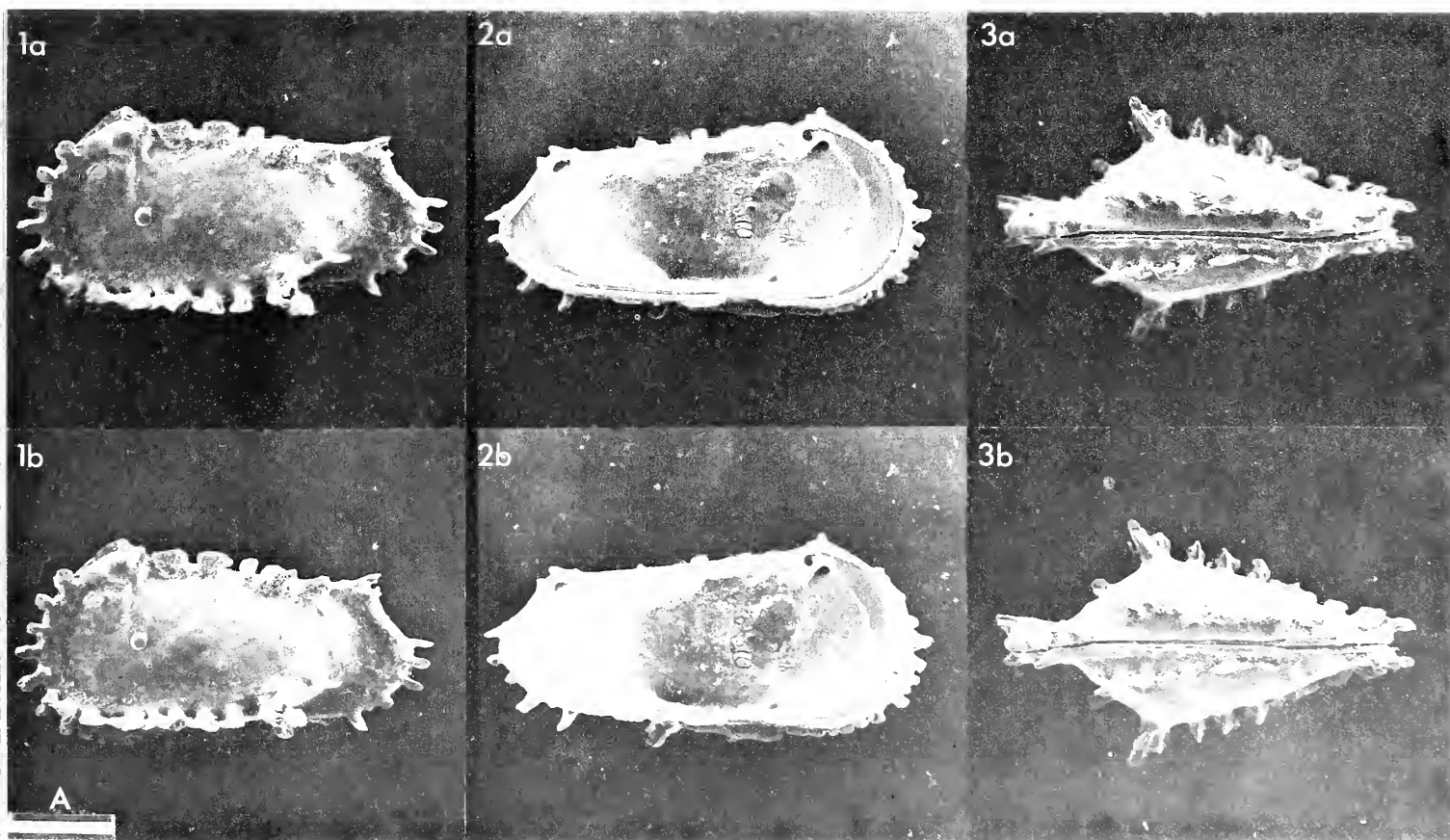
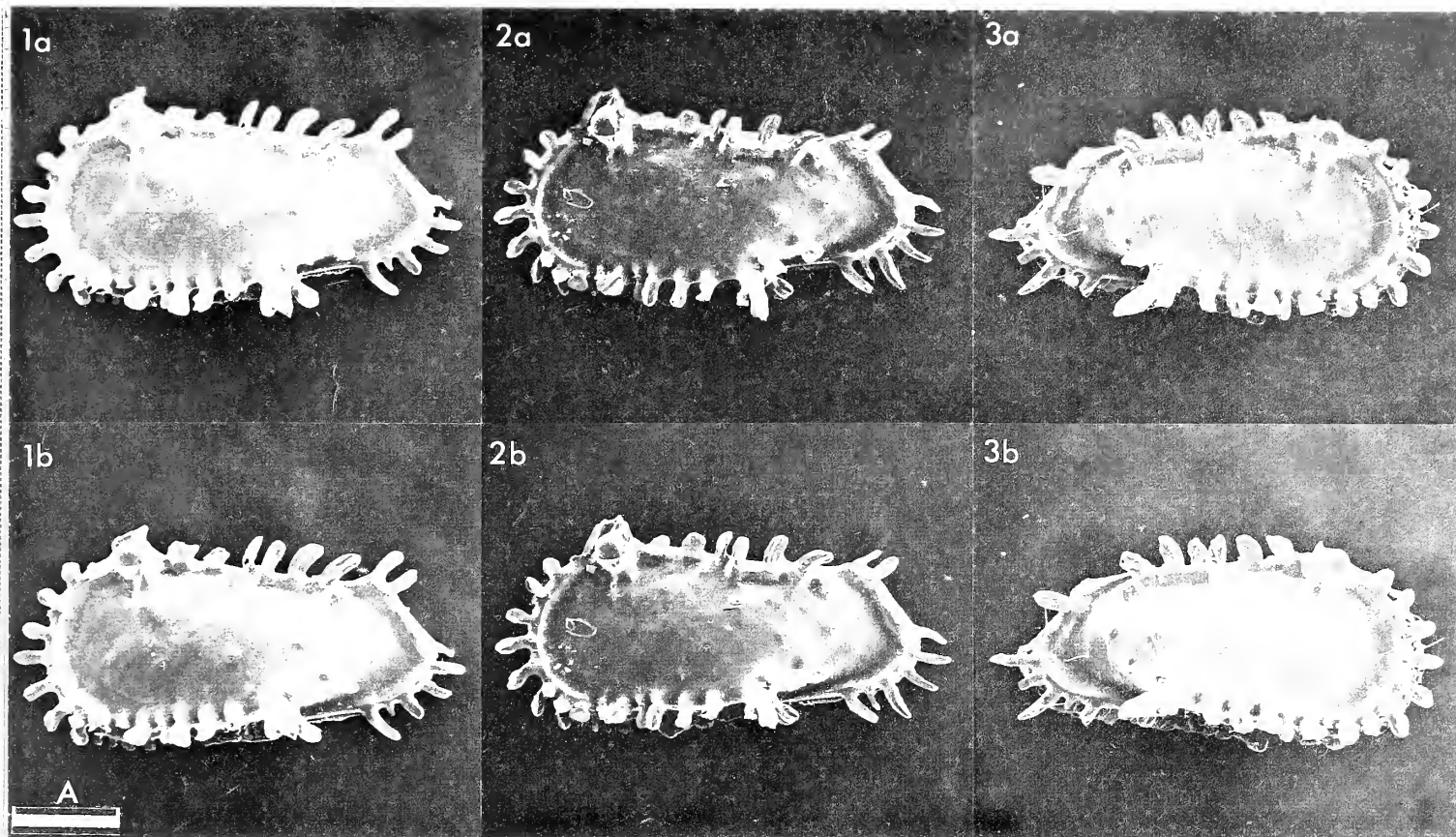
Juvenile - 1 instars bear a single, entire antero-dorsal carina, below which are two alternating rows of spines. The alar carinae show signs of development of disconnected clavae and a prominent, terminal spine posteriorly.

Only in the adult are the eye tubercles conspicuous and all the spines fully disconnected.

Distribution: Recent; Naples (author's coll. and as *Cythereis jonesii* Baird; Müller, *op. cit.*), Adriatic (author's coll.), Madeira (A. M. Norman coll.), NW Scotland, Bay of Biscay and Aegean (Brady coll.). Sub-Recent; Cyprus (author's coll.), Isle of Man (B. M. N. H. coll.), Adriatic (Bremner, 1975, *The Distribution of Ostracodes in the Bottom Sediments of the Adriatic Sea*, Thesis, University of Amsterdam), Smyrne (Brady, *op. cit.*).

Explanation of Plate 5, 4

Fig. 1, ?♀ LV, ext. lat. (1978.60, 980 µm long); fig. 2, ?♂ LV, int. lat. (1978.61, 1010 µm long); fig. 3, ?♂ car., ext. dors. (1978.62, 1000 µm long). Scale A (250 µm; x 58), figs. 1 - 3.

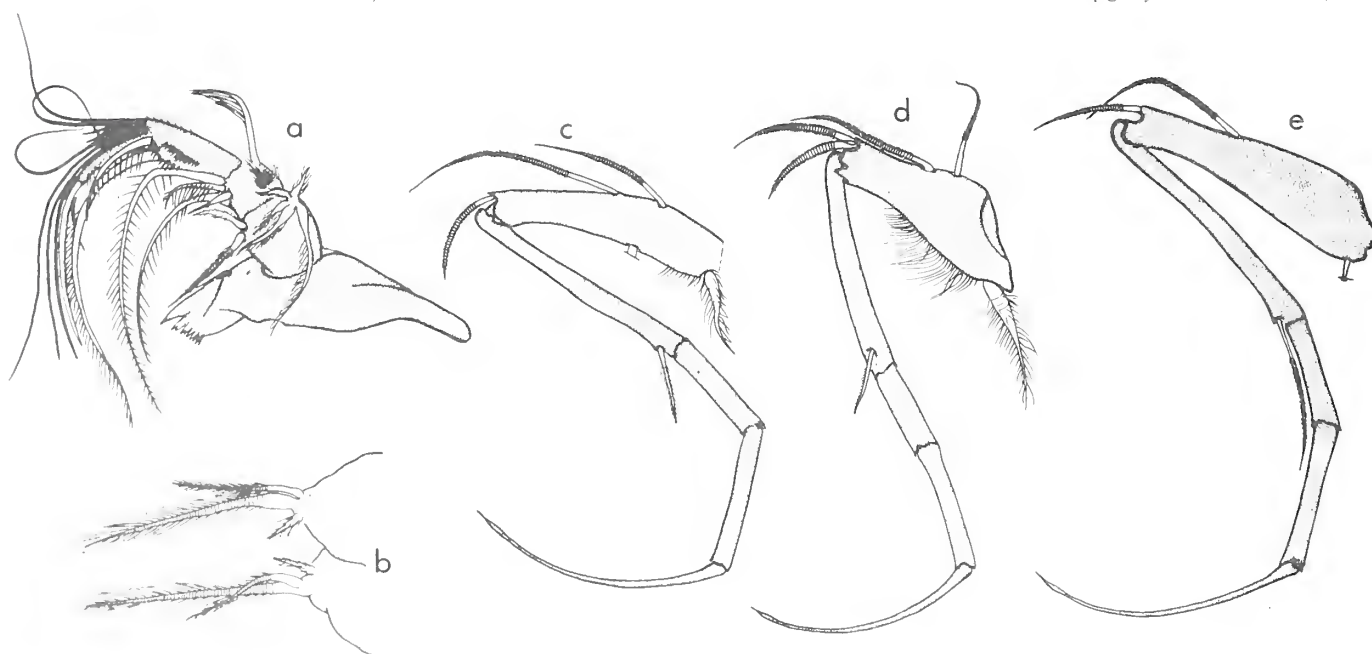




Text-fig. 1. Appendages. a: ♂ copulatory appendage; b: ♀ 1st. antenna; c: ♀ maxilla; d: ♂ 2nd. antenna (a: x 210, b - d: x 225).

Explanation of Plate 5, 6

Fig. 1, juv. - 1 LV, ext. lat. (1978.63, 853 μ m long); fig. 2, juv. - 4 car., ext. dors. (Hancock Museum specimen, 512 μ m long); fig. 3, holotype, ♀ RV, ant. clava with basal pore and setal tassel (1978.59); fig. 4, holotype, ♀ RV, post. setose tubercle (1978.59). Scale A (250 μ m; x 58), figs. 1, 2; scale B (20 μ m; x 870), fig. 3, scale C (20 μ m; x 830), fig. 4.

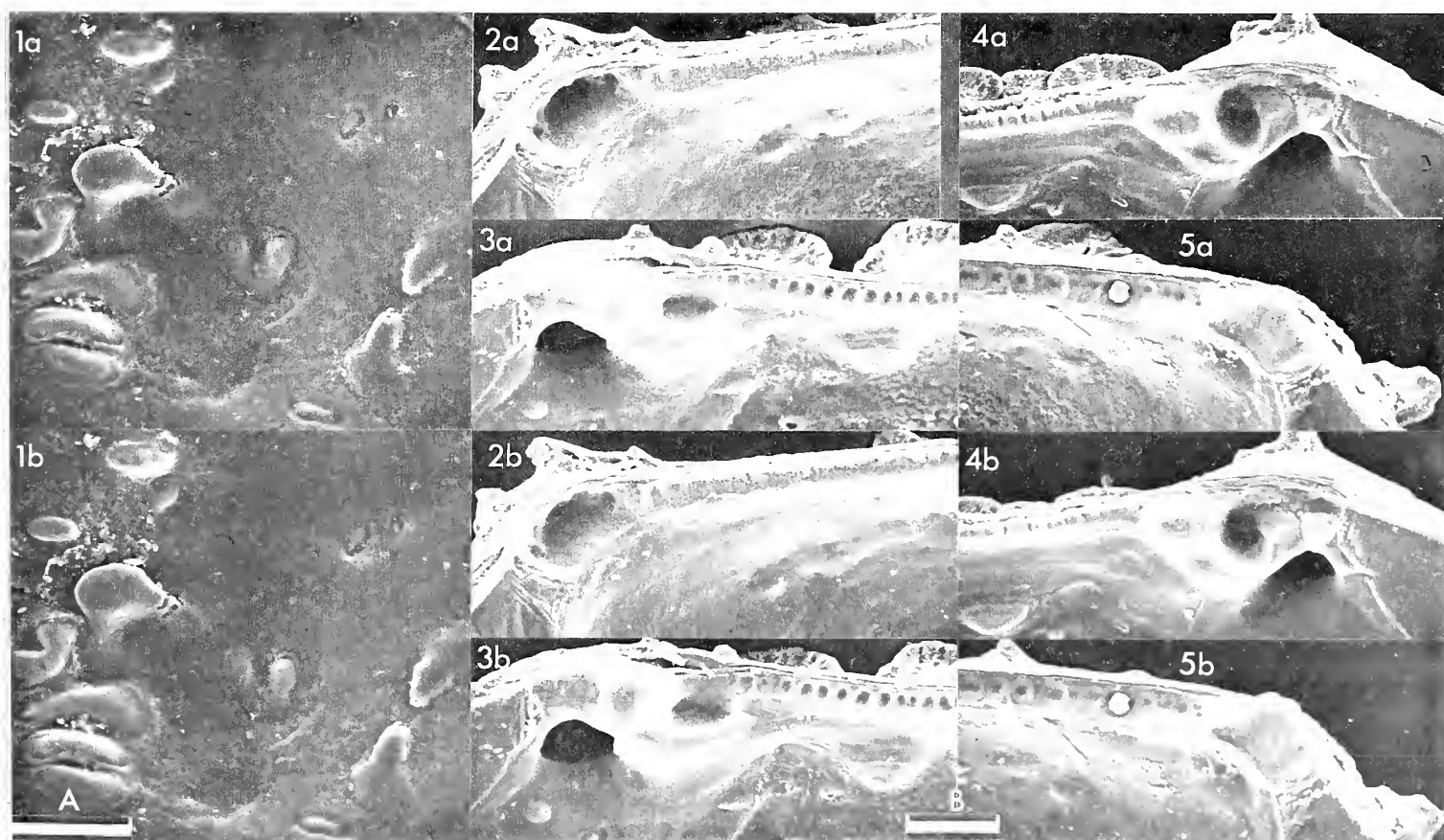
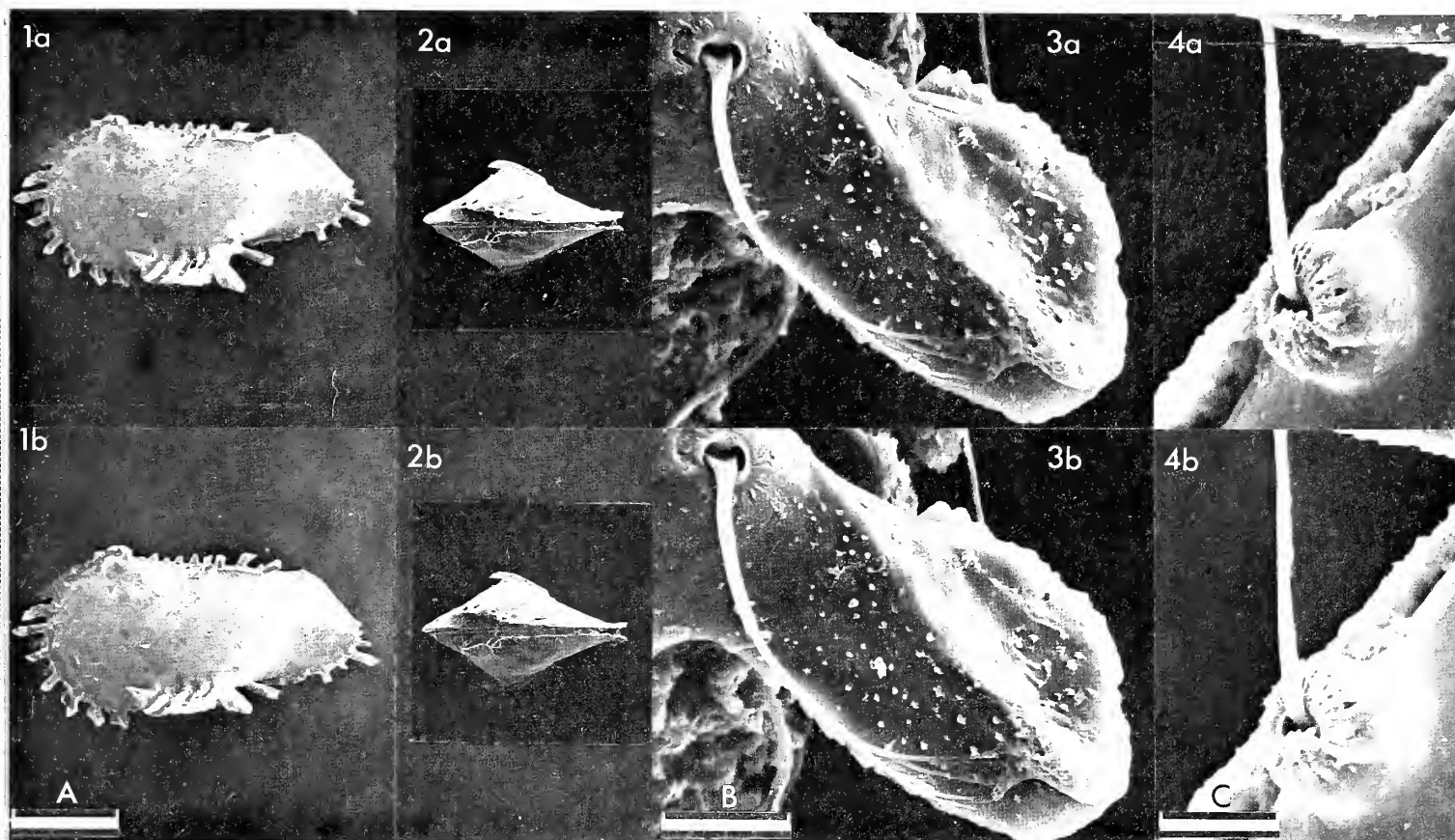


Text-fig. 2. Appendages. a: ♂ mandible; b: ♀ furcae; c: ♀ 1st. leg; d: ♀ 2nd. leg; e: ♀ 3rd. leg (a - e: x 225).

Explanation of Plate 5, 8

Fig. 1, ?♂ LV, int. lat. musc. sc. (1978.64); figs. 2, 4, ?♂ LV, terminal hinge elements (1978.58); figs. 3, 5, ?♂ RV, terminal hinge elements (1978.65).

Scale A (50 μ m; x 350), fig. 1; scale B (50 μ m; x 260), figs. 2 - 5.



595.337 14 (119.4 + 119.9) (411.7 : 162.005 55 + 413.3 : 162.003 57 + 411.7 : 162.005 55 + 413.3 : 162.003 57 + 261.275 : 162.005 55 + 428.9 : 162.005 54 + 261.273 : 162.004 53 + 417 : 162.010 54 + 428.2 : 162.001 54 + 420 : 162.005 51 + 261.28 : 162.002 45 + 261.26 : 161.002 58 + 261.248 : 161.012 57 + 261.263 : 161.010 58 + 457.2 : 161.014 40 + 262.3 : 161.018 42 + 453.33 : 161.014 45 + 262.4 : 161.025 38 + 564.3 : 161.033 35 + 262.538 : 027.41) : 551.351

ON *PTERYGOCYTHEREIS JONESII* (BAIRD)

by John Athersuch
(University of Leicester, England)

Genus *PTERYGOCYTHEREIS* Blake, 1933

Type species: (Original designation) Blake, 1933 *Wistar Inst. Anat. Biol.*, Philadelphia, p.239.

Pterygocythereis jonesii (Baird, 1850)

- 1850 *Cythereis jonesii* sp. nov. W. Baird: *The Natural History of the British Entomostraca*, Ray Society, 175, pl. 20, fig. 1.
 1866 *Cythereis subcoronata* Speyer; G. S. Brady, *Trans. zool. Soc. Lond.* 5, 384, pl. 60, figs. 9a - e (non *C. subcoronata* Speyer, 1863).
 1874 *Cythere jonesii* (Baird); G. S. Brady, H. W. Crosskey & D. Robertson, *Palaeontogr. Soc.*, (Monogr.), 171, pl. 12, figs. 4 - 6; ?pl. 12, fig. 7.
 1885 *Cythere jonesii* (Baird); A. Kaufmann, *Recl. zool. suisse*, 111, 146, pl. 6, figs. 1 - 4, pl. 7, figs. 1 - 6, pl. 9, figs. 1 - 12, pl. 10, figs. 6 - 12.
 1925 *Cythereis jonesi* Baird; G. O. Sars, *An account of the Crustacea of Norway*, vol. 9, *Ostracoda*, Bergen Museum, pts. 11 & 12, 196, pl. 91, all figures.
 1941 *Cythereis (Pterygocythereis) jonesi* Baird; O. Elofson, *Zool. Bidr. Upps.* 19, 302, figs. 12, 13.
 1941 *Pterygocythereis jonesii* (Baird); E. Triebel, *Senckenbergiana*, 23, 385.
 1954 *Pterygocythereis jonesii* (Baird); B. L. Hill, *J. Paleont.*, 28, 809, pl. 98, figs. 1a - e, pl. 99, figs. 1a - f.
 1960 *Cythereis jonesii* Baird; F. E. Caraion, *Revue Biol. Buc.* 5, 121, pl. 2, figs. 1a, b.
 1975 *Pterygocythereis jonesii* (Baird); G. Bonaduce, G. Ciampo & M. Masoli, *Pubbl. Staz. zool. Napoli*, 40 (1), 54, pl. 29, figs. 1 - 11.

Neotype: (Here designated) male right valve, left valve and copulatory appendage, housed with the Brady Collection, Hancock Museum, Newcastle-upon-Tyne; no catalogue number; separate slide.

Type locality: Kilchattan Bay, Isle of Bute SW Scotland (approx. lat 55° 48'N, long 05° 10'W); Recent.

Explanation of Plate 5, 10

Fig. 1, neotype, ♂ LV, ext. lat. (Hancock Museum specimen a, 1146 µm long); fig. 2, ♂ LV, ext. lat. (1975.1252, 1054 µm long); fig. 3, ♀ LV, ext. lat. (1978.51, 1048 µm long).
 Scale A (250 µm; x 54), figs. 1 - 3.

Figured specimens: Hancock Museum specimen a (neotype, ♂ LV: Pl. 5, 10, fig. 1); Hancock Museum specimen b (juv. - 1 car.: Pl. 5, 14, fig. 2); Hancock Museum specimen c (juv. - 3 car.: Pl. 5, 14, fig. 3); Hancock Museum specimen d (juv. - 5 car.: Pl. 5, 14, fig. 4). Brit. Mus. (Nat. Hist.) specimen 1975.1252 (♂ LV: Pl. 5, 10, fig. 2); 1978.51 (♀ LV: Pl. 5, 10, fig. 3); 1978.52 (♀ car.: RV: Pl. 5, 12, fig. 1; LV: Pl. 5, 16, fig. 1; Text-fig. 1d); 1978.53 (♂ LV: Pl. 5, 12, fig. 2; Pl. 5, 16, figs. 3, 5; Text-figs. 1a - c, e, 2a - e); 1978.54 (♂ car.: Pl. 5, 12, fig. 3); 1978.55 (juv. - 2 LV: Pl. 5, 14, fig. 1); 1978.56 (♂ car.: LV: Pl. 5, 16, fig. 2; RV: Pl. 5, 16, figs. 4, 6). The Hancock Museum specimens were taken from the Brady ostracod collection; no catalogue numbers, but placed in separate, labelled slides; specimens a & b from Kilchattan Bay, Scotland, specimen c from Rothesay, Scotland and specimen d from the coast of Durham, NW England. 1975.1252 from beach sand, Kyrenia, N Cyprus, collected by J. Athersuch; 1978.51 - 53 from the Bay of Naples, Italy, collected by Dr. G. Bonaduce; 1978.54 - 56 are from the Forties Field in the N Sea.

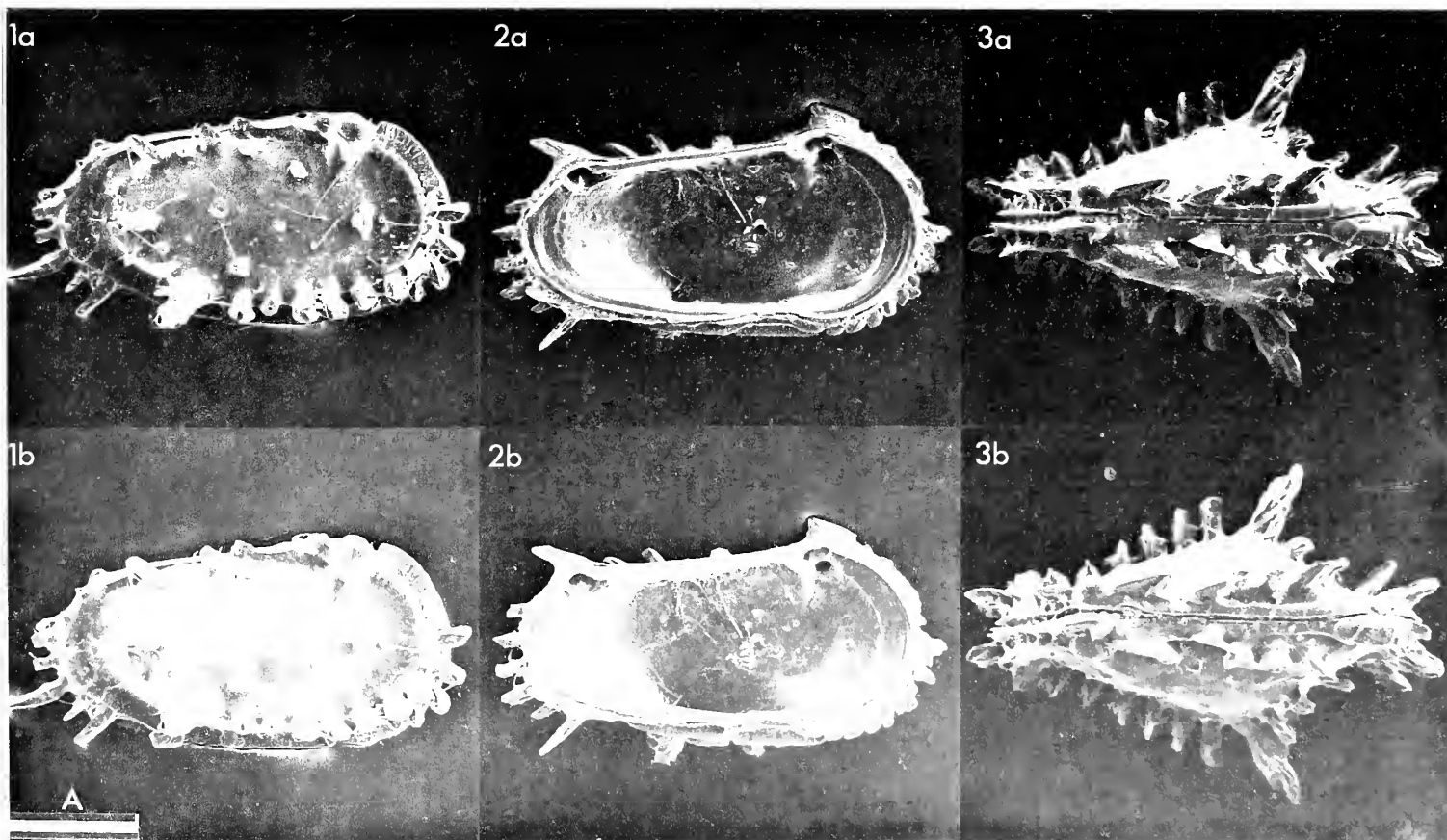
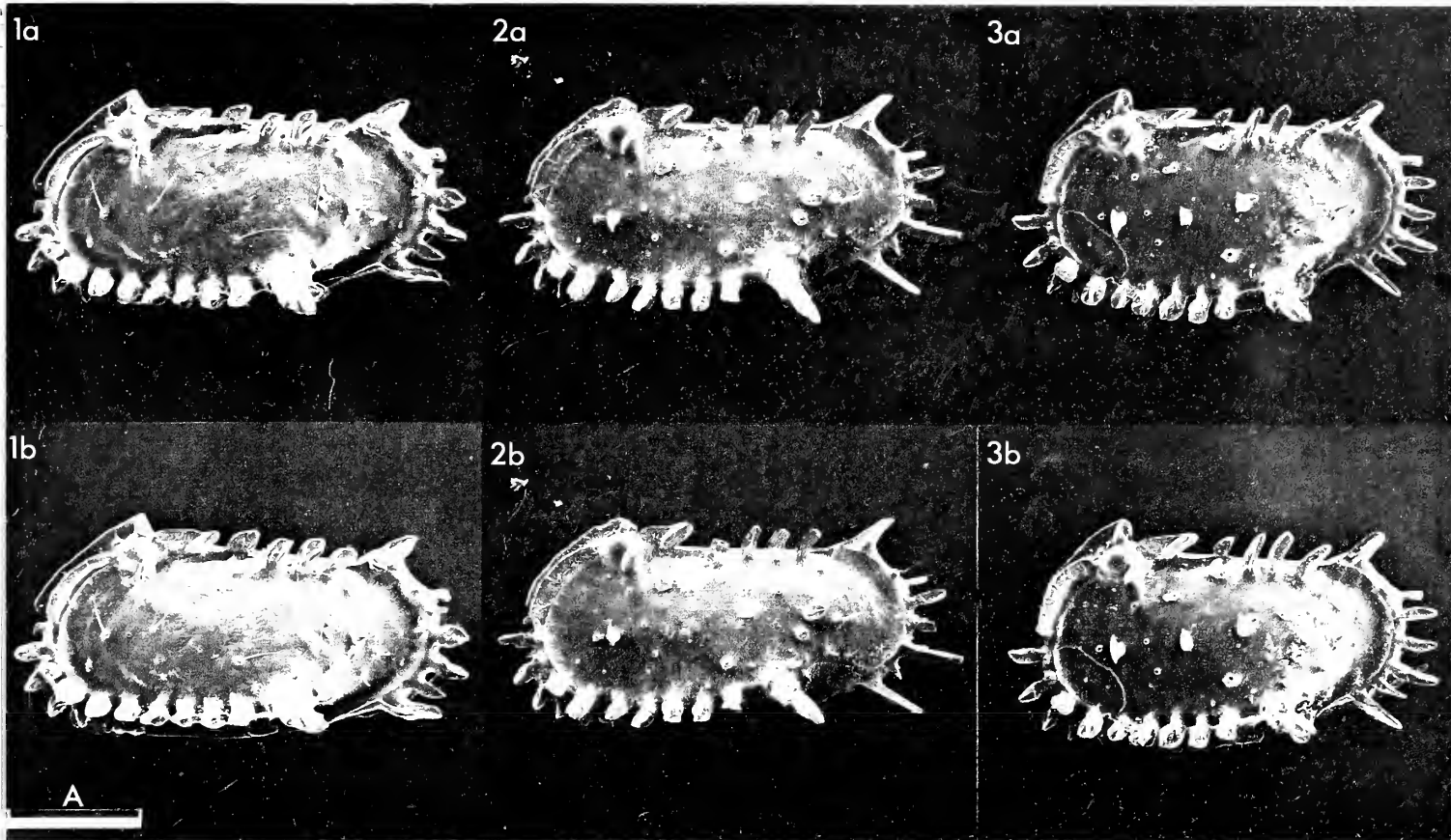
Diagnosis: Anterior margin of each valve with thickened rim supporting two carinae which are entire antero-dorsally and disconnected antero-ventrally; inner carina extends dorsally past eye tubercle in left valve only. Posterior margin rounded, bears six prominent, angular spines. Each valve bears single postero-dorsal spine; most conspicuous in the left valve. Male copulatory appendages distinctive.

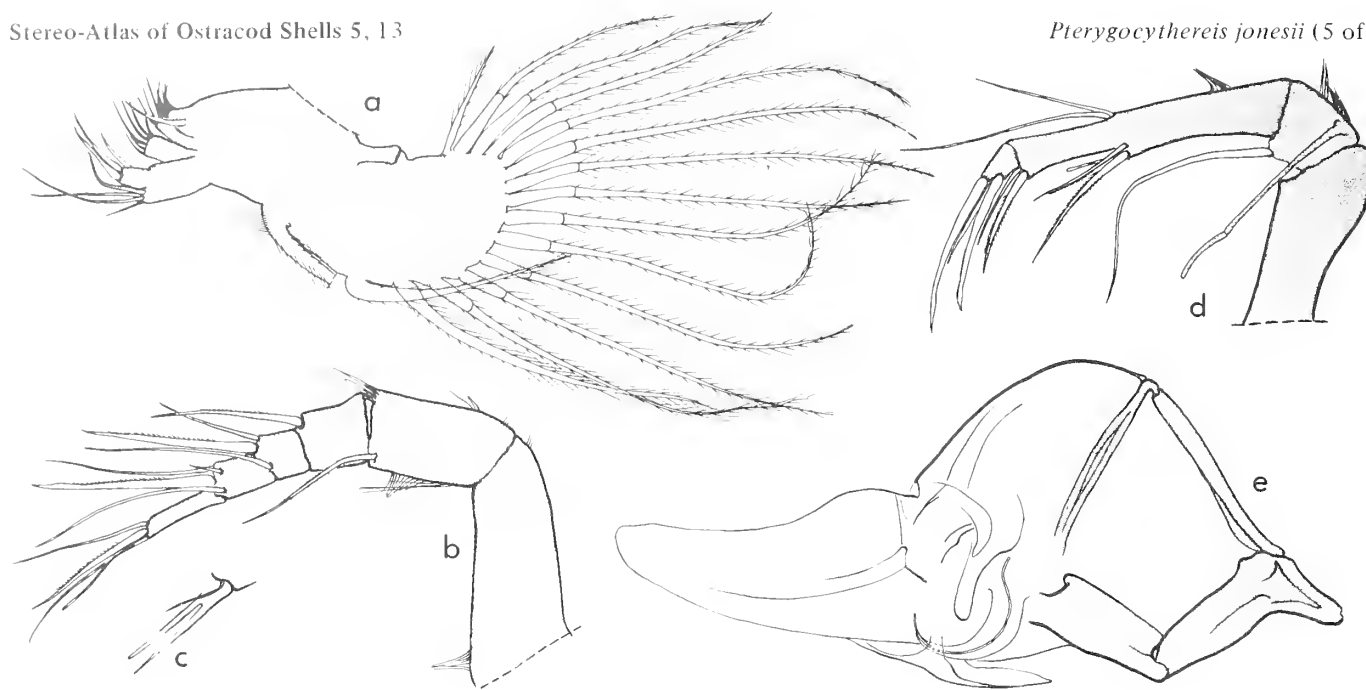
Remarks: Some adult specimens laterally bear up to eleven mammillate and clavellate spines. Males more elongate than females. The smallest specimen found, believed to be a -5 instar (see Pl. 5, 14, fig. 4) anteriorly bore only a single entire carina. The -4 instar bears two anterior carinae, the inner one being entire, the outer one disconnected. With each subsequent moult, more spines are developed, accompanied by disconnection of the marginal and alar clavae (Pl. 5, 14, figs. 1 - 3; Pl. 5, 12, fig. 3). Prominent eye tubercles are fully disconnected, alar carinae appear only in the adults.

Distribution: Recent; many localities in SW Scotland, NE England, Isle of Man, W Ireland, SW England (Brady Coll.); Firth of Forth (B.M. (N.H.) coll.) N Sea (Brady and author's colls.); Kattegat & Skagerak (Brady & Elofson colls., Sars, 1925, *op. cit.*); Bay of Biscay (Brady coll.); Naples, S Adriatic, Cyprus (author's coll.); Bosphorus (Caraion, *op. cit.*); Trieste (Kaufmann, *op. cit.*); Aegean Sea (Brady, coll.). Sub-Recent; Skye (Baird, *op. cit.*); Arran (Baird coll.); Cardigan Bay, Wales; Adriatic.

Explanation of Plate 5, 12

Fig. 1, ♀ RV, ext. lat. (1978.52, 1170 µm long); fig. 2, ♂ LV, int. lat. (1978.53, 1195 µm long); fig. 3, ♂ car., ext. dors. (1978.54, 1195 µm long).
 Scale A (250 µm; x 54), figs. 1 - 3.



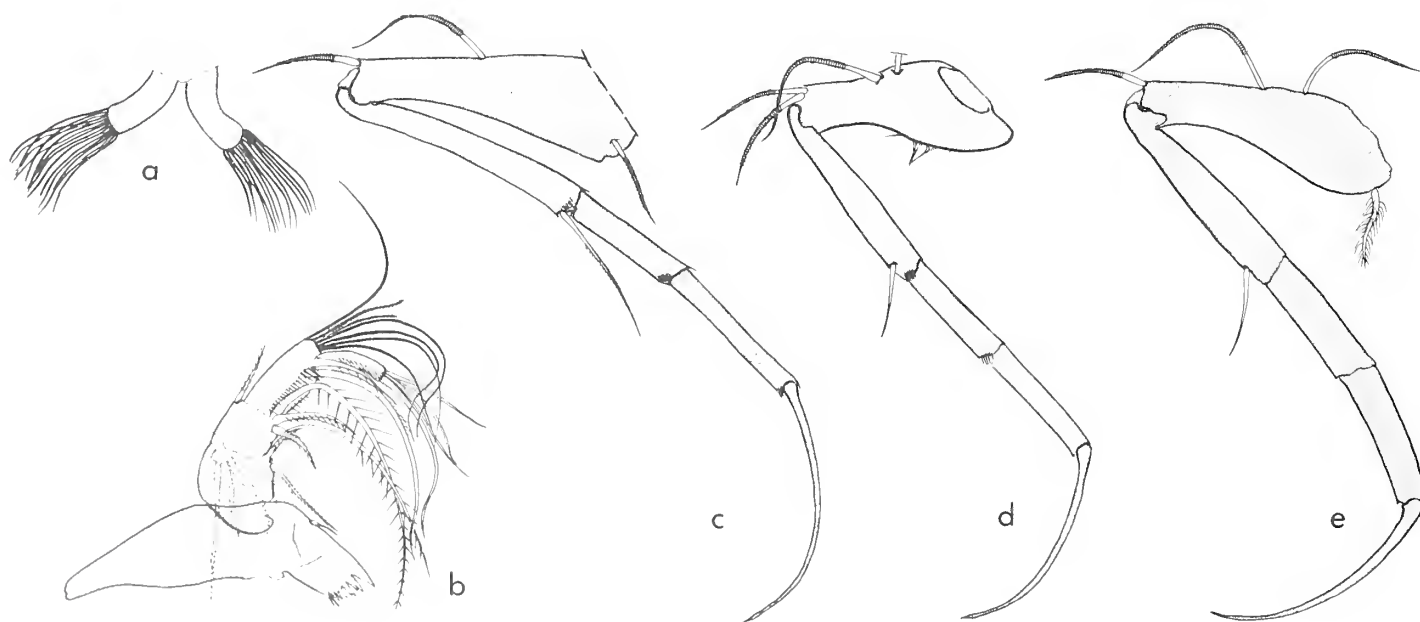


Text-fig. 1. Appendages a: ♂ maxilla; b: ♂ 1st. antenna; c: enlargement of terminal setae of 1st. ♂ antenna; d: ♀ 2nd. antenna; e: ♂ copulatory appendage (a - e: x 225).

Explanation of Plate 5, 14

Fig. 1, juv. - 2 LV, ext. lat. (1978.55, 756 μ m long); fig. 2, juv. - 1 car., ext. dors. (Hancock Museum specimen b, 866 μ m long); fig. 3, juv. - 3 car., ext. dors. (Hancock Museum specimen c, 707 μ m long); fig. 4, juv. - 5 car., ext. dors. (Hancock Museum specimen d, 536 μ m long).

Scale A (250 μ m; x 54), figs. 1 - 4.

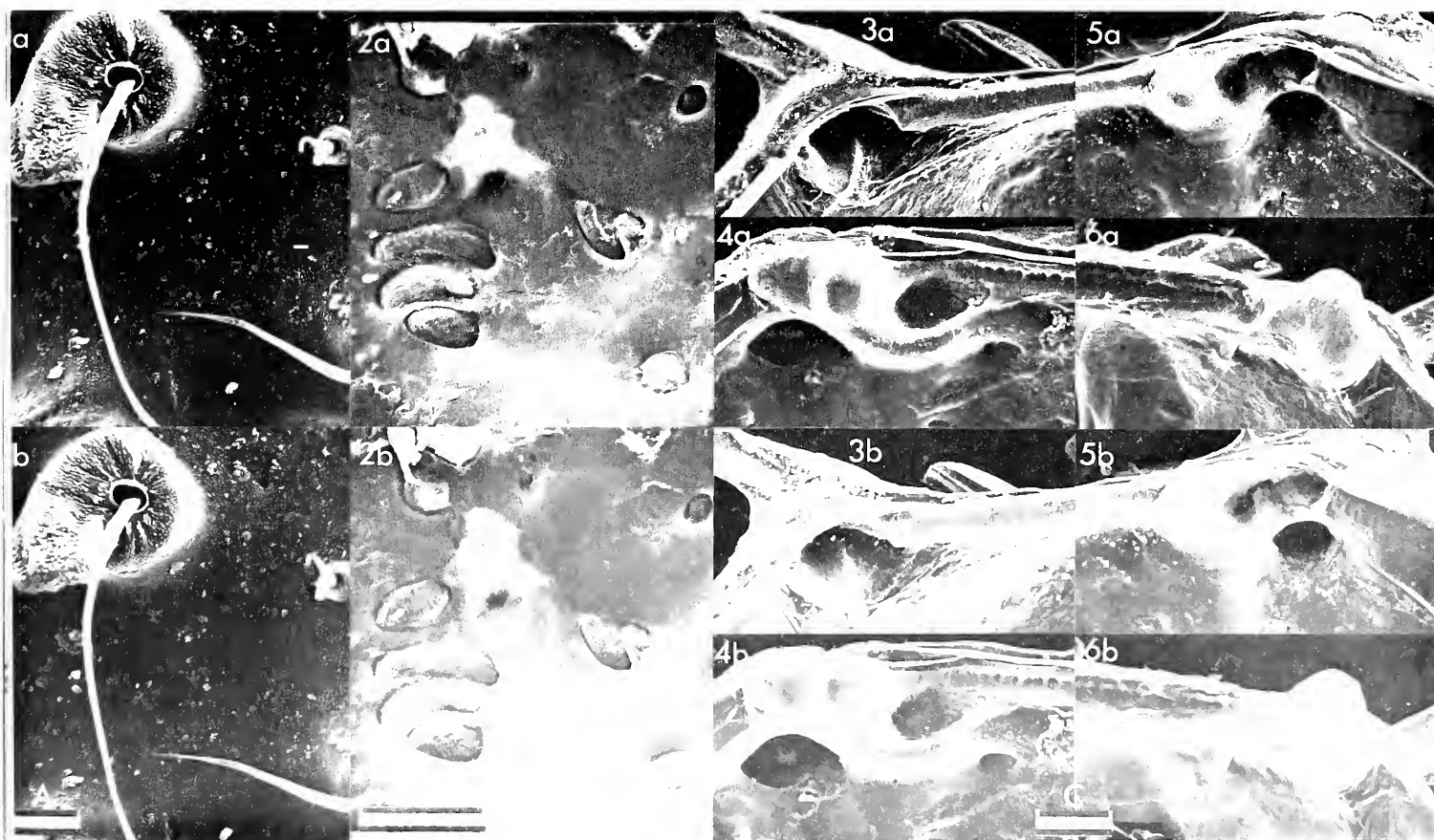
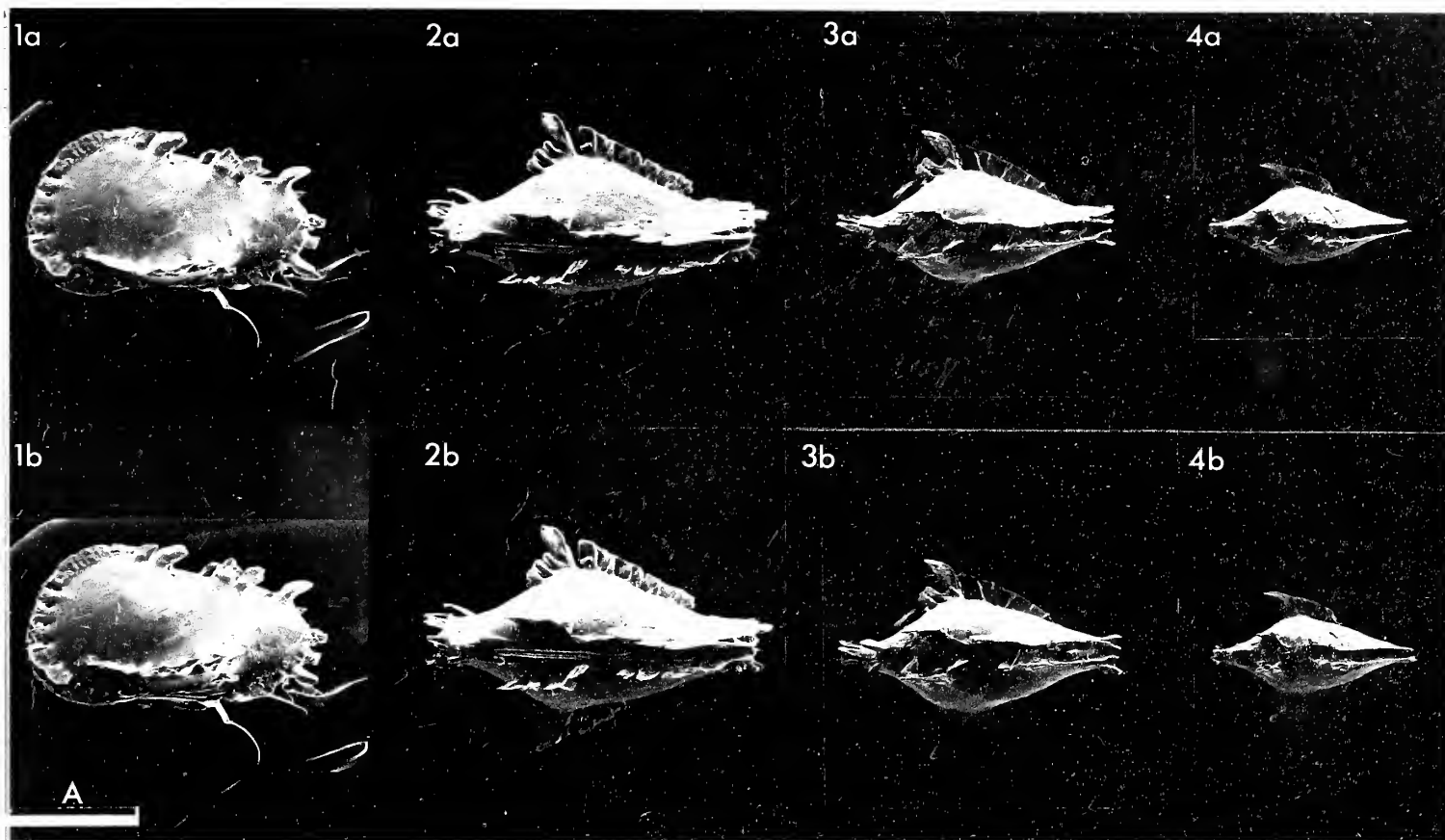


Text-fig. 2. ♂ appendages. a: brush-shaped organs; b: mandible; c: 3rd. leg; d: 2nd. leg; e: 1st. leg (a - e: x 225).

Explanation of Plate 5, 16

Fig. 1, ♀ LV, spine with setose pore (1978.52); fig. 2, ♂ LV int. lat. musc. sc. (1978.56); figs. 3, 5, ♂ LV, terminal hinge elements (1978.53); figs. 4, 6, ♂ RV, terminal hinge elements (1978.56).

Scale A (25 μ m; x 455), fig. 1; scale B (50 μ m; x 350), fig. 2; scale C (50 μ m; x 210), figs. 3 - 6.



ON *XESTOLEBERIS NITIDA* (LILJEBORG)

by John E. Whittaker
(British Museum (Natural History), London)

Genus *XESTOLEBERIS* Sars, 1866

Type-species: (Subsequent designation by Brady & Norman, 1889): *Cythere nitida* Liljeborg, 1853.

Diagnosis: Carapace smooth and thin, sub-reniform to sub-triangular in side view, without postero-ventral projection. Dimorphic, female strongly inflated posteriorly (contains brood-chamber or "marsupium"), male not as broad and laterally more elongate. Ventral surface (venter) rounded to flattened. Distinctive crescent-shaped "*Xestoleberis* - spot" behind ocular pit. Pores of both sieve- and simple funnel-type. Marginal (radial) pore canals straight or branching. Male copulatory organs usually with asymmetrical lappets.

Remarks: Characters useful for species differentiation are: shape and colour of pigmented areas; shape of ventral surface of the carapace; position and shape of opaque spots; length and shape of marginal pore canals especially postero-ventrally; shape of terminal lappets of male copulatory appendages, and possibly the number and size of the sieve-pore perforations.

Explanation of Plate 5, 18

Fig. 1, ♀ car., ext. lt. lat. (1977.1, 590 µm long); fig. 2, ♂ car., ext. lt. lat. (1977.2, 530 µm long); fig. 3, ♂ copulatory appendages, vent. view (1977.3, ♂ car., 520 µm long).
Scale A (200 µm; x 110), figs. 1, 2; scale B (50 µm; x 280), fig. 3.

Xestoleberis nitida (Liljeborg, 1853)

- 1853 *Cythere nitida* sp. nov. W. Liljeborg, *De Crustaceis ex ordinibus tribus: Cladocera, Ostracoda et Copepoda, in Scania occurrentibus*, Lund, 169, pl. 19, figs. 6, 7.
1854 *Cythere viridis* O. F. Müller; W. Zenker, *Arch. Naturgesch.* 20, 86, pl. 5, figs. A1, A2. (non *C. viridis* O. F. Müller, 1785).
1866 *Xestoleberis nitida* (Liljeborg)*; G. O. Sars, *Forh. VidenskSelsk. Krist.* 1865, 67.
1928 *Xestoleberis aurantia* (Baird); G. O. Sars, *An account of the Crustacea of Norway vol. 9, Ostracoda*, Bergen Museum, 243, pl. 111, fig. 1. (non *Cythere aurantia* Baird, 1838).

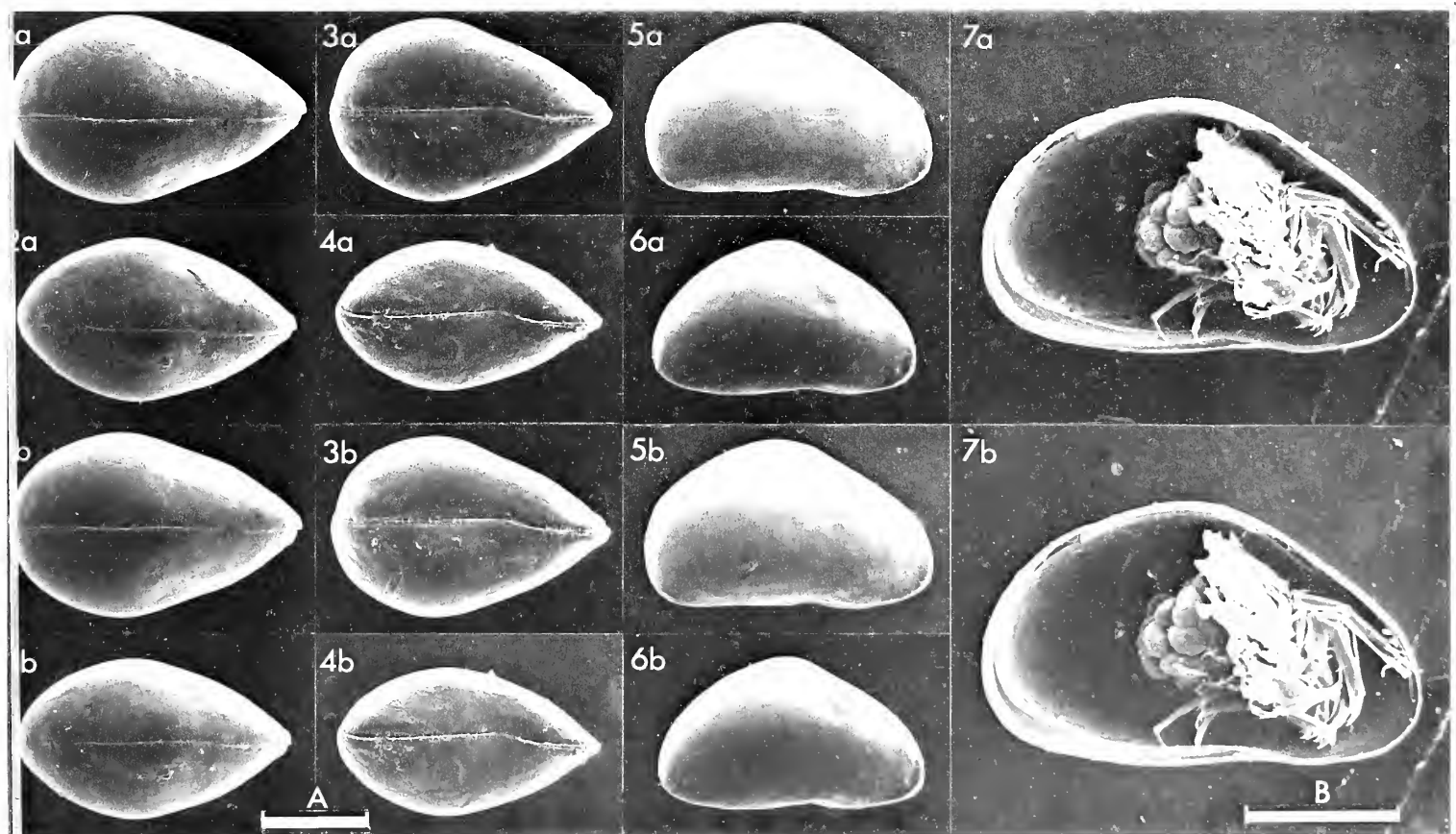
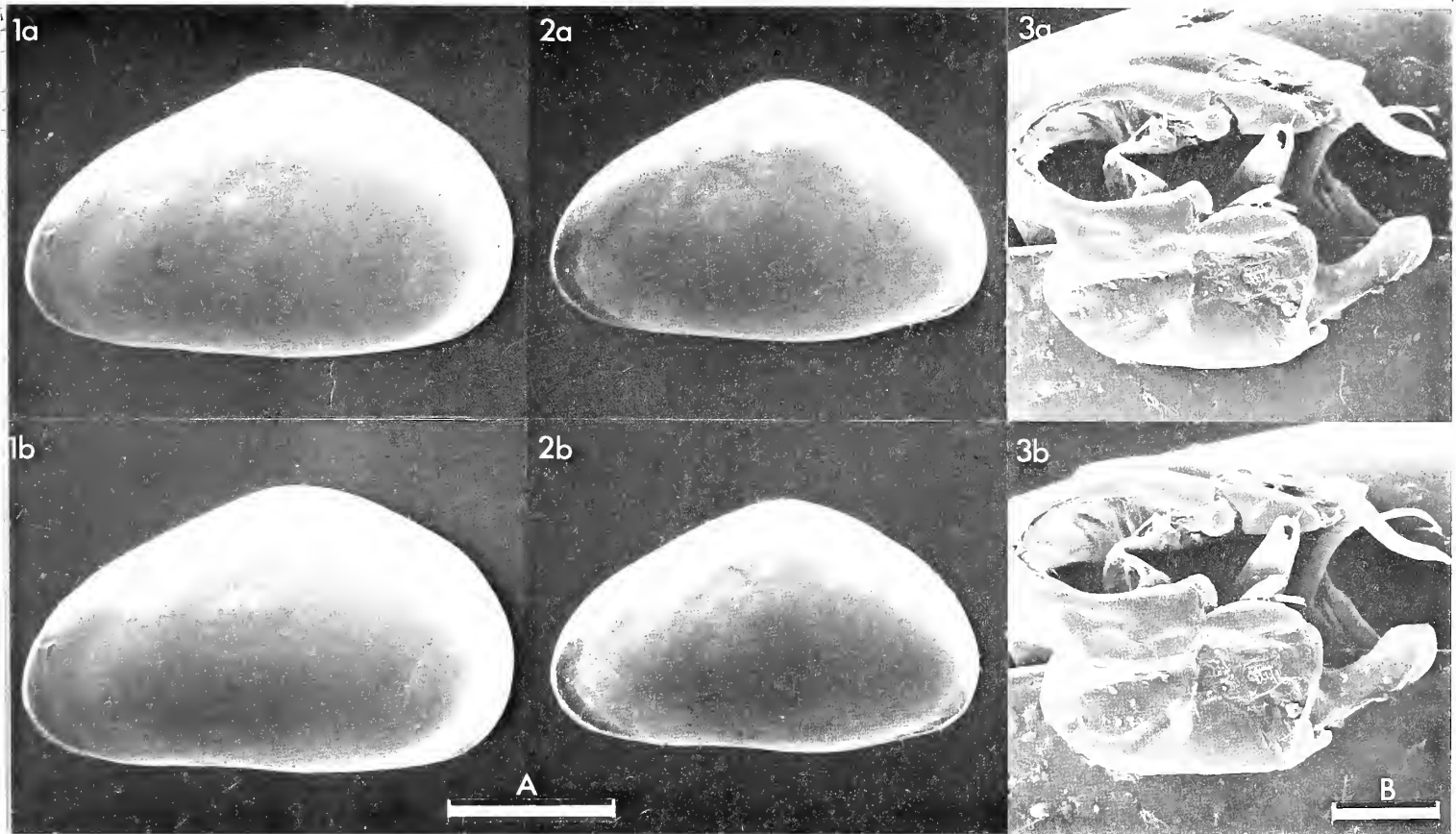
*[Around 1860 Wilhelm Liljeborg changed his name to William Lilljeborg.]

Type specimens: Liljeborg's type-material of *Cythere nitida* is not in the collections of the Zoological Museums of Stockholm, Uppsala or Lund, and must be presumed lost (R. Oleröd, pers. comm.).

Type locality: On the eastern shore of the Öresund, near Kullen, SW Sweden, approx. long. 56° 10'N, lat. 12° 40'E. The sampling point must have been in brackish-water, as Liljeborg records *C. gibbera* (O. F. Müller) (= *Cytherura gibba*) and *C. viridis* (non Müller) (= *Loxoconcha elliptica* Brady) from the same locality.

Explanation of Plate 5, 20

Fig. 1, ♀ car., ext. dors. (1977.4, 580 µm long); fig. 2, ♂ car., ext. dors. (1977.5, 540 µm long); fig. 3, ♀ car., ext. vent. (1977.6, 560 µm long); fig. 4, ♂ car., ext. vent. (1977.7, 510 µm long); fig. 5, ♀ RV, ext. lat. (1977.8, 540 µm long); fig. 6, ♂ RV ext. lat. (1977.9, 510 µm long); fig. 7, ♀ I.V., int. lat. (1977.10, 600 µm long) showing soft parts and eggs.
Scale A (200 µm; x 70), figs. 1 - 6; scale B (200 µm; x 100), fig. 7.



Figured specimens: Brit. Mus. (Nat. Hist.) nos. 1977.1 (♀ car.: Pl. 5, 18, fig. 1), 1977.2 (♂ car.: Pl. 5, 18, fig. 2), 1977.3 (♂ car.: Pl. 5, 18, fig. 3), 1977.4 (♀ car.: Pl. 5, 20, fig. 1), 1977.5 (♂ car.: Pl. 5, 20, fig. 2), 1977.6 (♀ car.: Pl. 5, 20, fig. 3), 1977.7 (♂ car.: Pl. 5, 20, fig. 4; Pl. 5, 24, fig. 5), 1977.8 (♀ RV: Pl. 5, 20, fig. 5), 1977.9 (♂ RV: Pl. 5, 20, fig. 6), 1977.10 (♀ LV and soft parts: Pl. 5, 20, fig. 7), 1977.11 (♀ RV: Pl. 5, 22, figs. 1, 3, 5; Pl. 5, 24, fig. 1), 1977.12 (♀ LV: Pl. 5, 22, figs. 2, 4, 6; Pl. 5, 24, fig. 2), 1977.13 (♂ LV: Pl. 5, 24, fig. 3), 1977.14 (♀ RV: Pl. 5, 24, fig. 4), 1977.107 (♂ copulatory appendages: Text-fig. 1).

All specimens were collected alive by J. E. Whittaker: 1977.1, 2, 4 - 14, 107, from various stations in the Fleet, Dorset, S England, between Top Ferry (approx. lat. 50° 39'N, long. 2° 35'W), West Fleet, and Tidmoor Point (approx. lat. 50° 36'N, long. 2° 20'W), its southwesterly-most occurrence in the Fleet lagoon; 2 - 3rd August 1969, salinity 20 - 30‰, water temperature 18 - 20°C, on green-algae and *Zostera* spp. 1977.3, from La Teste de Buch, S Arcachon Basin, SW France, approx. lat. 44° 39'N, long. 1° 09'W on *Zostera*.

Explanation of Plate 5, 22

Figs. 1, 3, 5, ♀ RV, int. lat. (1977.11, 580 µm long); fig. 1, int. lat.; fig. 3, ant. hinge; fig. 5, post. hinge. Figs. 2, 4, 6, ♀ LV, int. lat. (1977.12, 570 µm long); fig. 2, int. lat.; fig. 4, post. hinge; fig. 6, ant. hinge.
Scale A (200 µm; x 90), figs. 1, 2; scale B (100 µm; x 200), figs. 3 - 6.

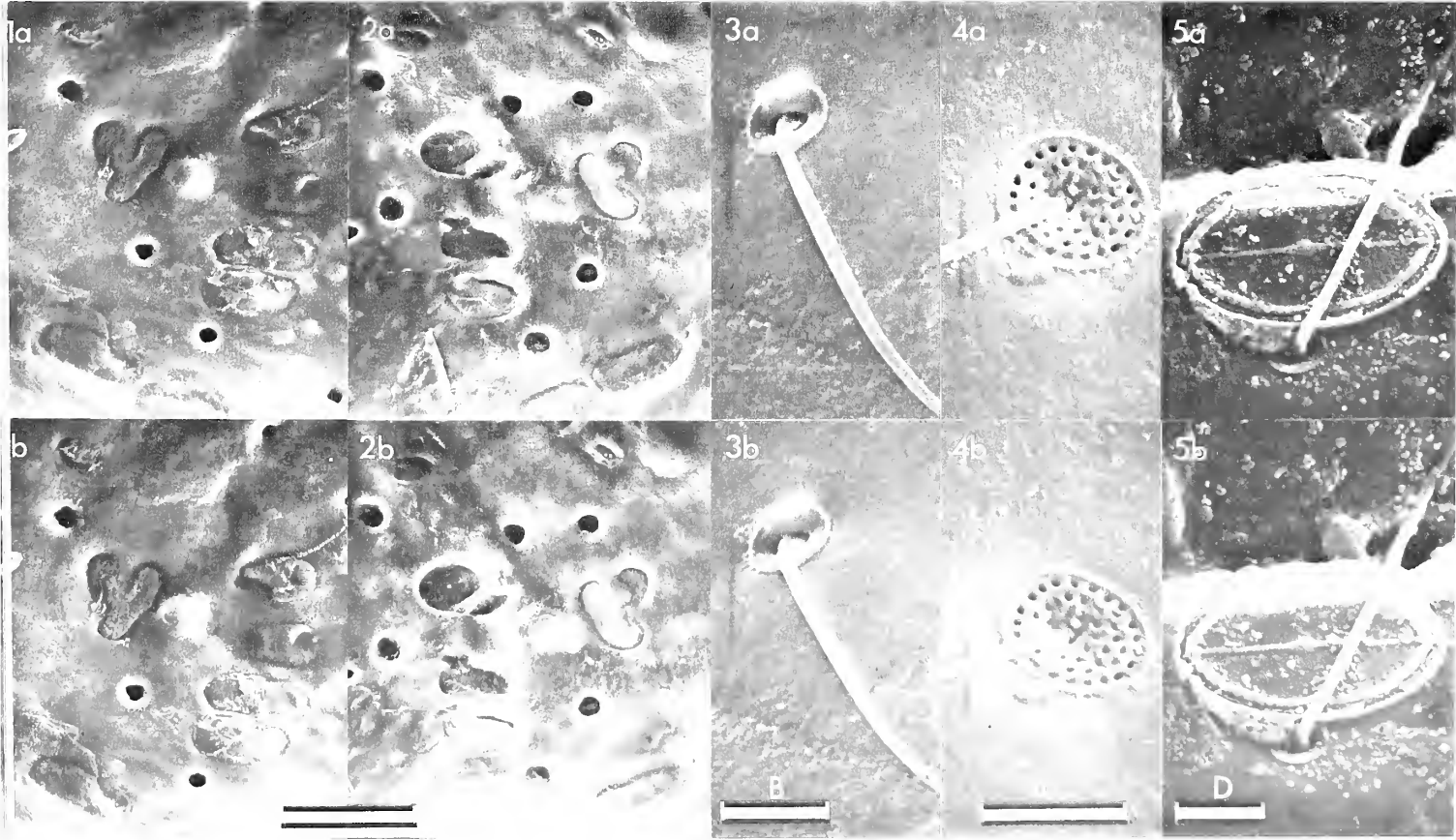
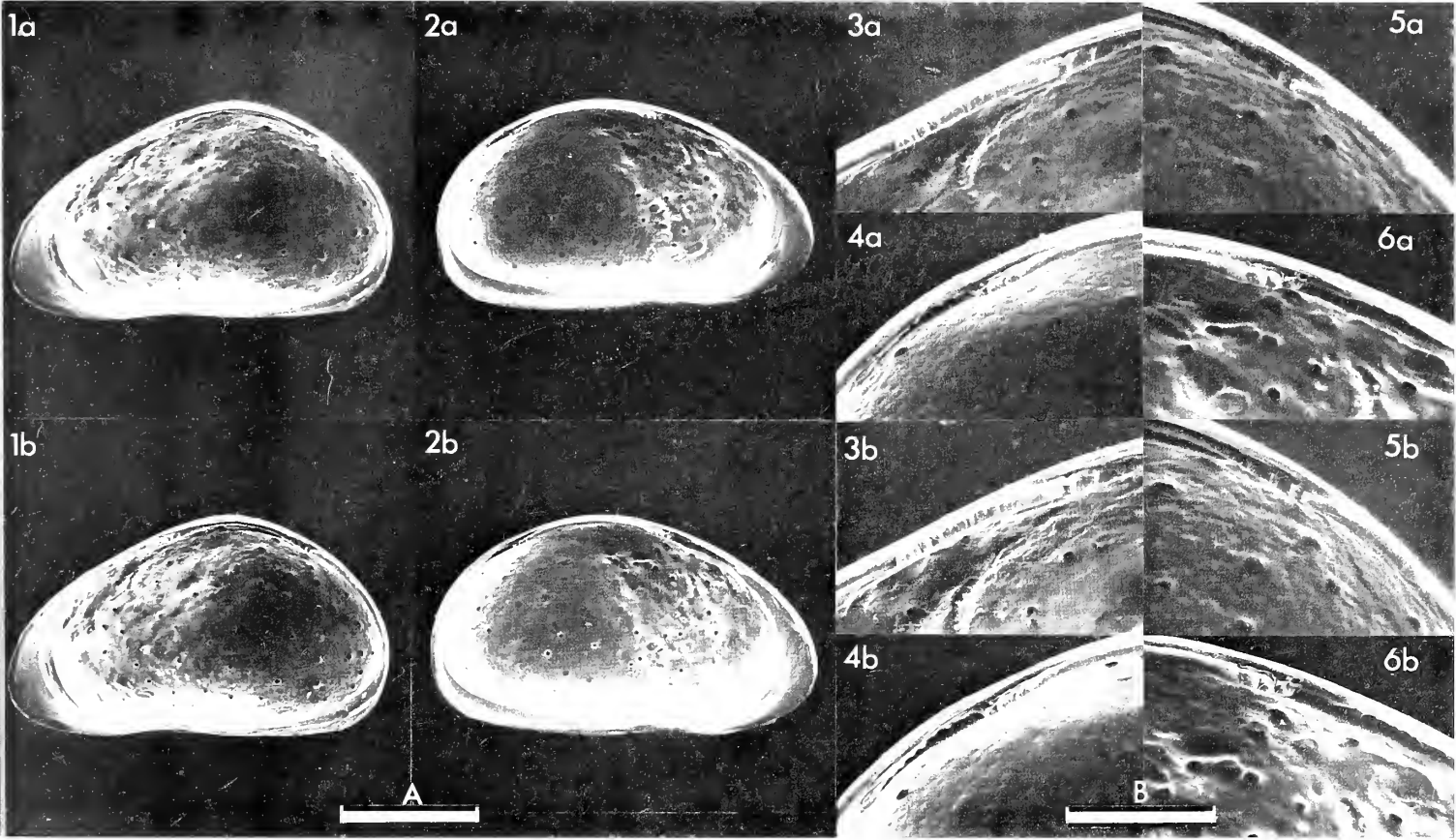
Diagnosis: Adults 500 - 600 µm long. Shell strongly inflated in dorsal aspect, especially so in female. Subtriangular in lateral view, particularly the male; dorsal margin umbonate, ventral margin without marked oral concavity. Venter flat. Opaque area small and just behind "*Xestoleberis*-spot". Postero-ventral marginal pore canals straight and fairly short. Terminal lappets of male copulatory appendages with distinctive outline. Living specimens shiny, usually white.



Text-fig. 1, ♂ copulatory appendages (scale = 100 µm; 1977.107).

Explanation of Plate 5, 24

Fig. 1, ♀ RV, musc. sc. (1977.11); fig. 2, ♀ LV, musc. sc. (1977.12); fig. 3, funnel-shaped simple pore, ant. dors. region (♂ LV, 1977.13); fig. 4, flush sieve-type pore, post. dors. region (♀ RV, 1977.14); fig. 5, ♂ car., showing part of vent. region with attached diatom, marginal funnel pore and seta (1977.7).
Scale A (50 µm; x 360), figs. 1, 2; scale B (5 µm; x 2,800), fig. 3; scale C (5 µm; x 3,800), fig. 4; scale D (5 µm; x 2,200), fig. 5.



Remarks: The present material is undoubtedly conspecific with Liljeborg's description and illustration (a male) of 1853, as in Zenker's 1854 citation under the name *Cythere viridis* (*non* Müller); Zenker also illustrates the distinctive triangular male, and the copulatory appendage shown in his Pl. 5, fig. A2 can be seen to be identical with my Text-fig. 1.

When Sars, 1866, erected *Xestoleberis* he included only *Cythere nitida* Liljeborg, and his new species *X. depressa*; unfortunately he failed to select a type species. This was designated by Brady & Norman, 1889 (*Scient. Trans. R. Dubl. Soc.*, ser. 2, 5, 188), when they made the former the type, but at the same time declaring it a junior synonym of *Cythere aurantia* Baird, 1838. Sars, himself, subsequently followed Brady & Norman's erroneous conclusion that *X. nitida* and *X. aurantia* were one and the same. Liljeborg's species is here re-instated as the valid name for the brackish-water *X. aurantia auct. (non* Baird) as it can be shown to be distinct from Baird's species (see *Stereo-Atlas of Ostracod Shells* 5, 27 - 34, 1978, for further discussion). *X. nitida* is also type species as the genus must be based on Liljeborg's species; see Sylvester-Bradley (*Ann. Mag. nat. Hist.*, ser. 11, 13, 195).

Distribution: In synonymising *X. nitida* and *X. aurantia*, authors have neglected the important ecological differences of the two species. Whereas the latter is restricted to littoral marine habitats, *X. nitida* is one of the few species of *Xestoleberis* to be found predominantly in brackish-water. In Britain, I have never found it in the "open sea", although it can withstand salinities of over 30‰ in estuaries and lagoons. In the Fleet, S England, it gradually replaces the marine *X. rubens* Whittaker, 1978 (see *Stereo-Atlas of Ostracod Shells*, 5, 35 - 44, 1978) as the salinity decreases, and tends to be found mainly in water of 15 - 30‰, associated with *Zostera* and green-algae.

Records of *X. nitida* in N W Europe can be confirmed from various localities from the Arcachon Basin (illustrated herein) in the S, to W Norway (Sars, 1866, 1928; B.M. (N.H.) coll.) in the N; also it is probably widespread in the Baltic. Records of *X. aurantia auct.*, both fossil and Recent, must be carefully re-examined before the full geographic and stratigraphic distribution is known.

ON *XESTOLEBERIS AURANTIA* (BAIRD)by John E. Whittaker
(British Museum (Natural History), London).*Xestoleberis aurantia* (Baird, 1838)

- 1938 *Cythere aurantia* sp. nov. W. Baird, *Mag. Zool. Bot.* 2, 143, pl. 5, fig. 26.
 1868 *Xestoleberis aurantia* (Baird); G. S. Brady, *Trans. Linn. Soc. Lond.* 26, 437, pl. 27, figs. 34 - 37; pl. 39, fig. 6.
 1941 *Xestoleberis pusilla* sp. nov. O. Elofson, *Zool. Bidr. Upps.* 19, 341, text-figs. 22 - 25.
 non 1928 *Xestoleberis aurantia* (Baird); G. O. Sars, *An account of the Crustacea of Norway vol. 9, Ostracoda*, Bergen Museum, 243, pl. 111, fig. 1. (= *X. nitida* Liljeborg, 1853).
 non 1957 *Xestoleberis aurantia* (Baird); A. P. C. de Vos, *Archs. Zool. exp. gén.* 95 (n. ser. 8), 48, pl. 18, fig. 4a; pl. 19, figs. 4a - d; pl. 20, figs. 1a - e. (= *X. rubens* Whittaker, 1978).
 non 1957 *Xestoleberis aurantia* (Baird); I. Yassini, *Bull. Inst. Géol. Bassin Aquitaine*, 7, 125, pls. 5 - 7, 9, 11 - 13, 15. (= *X. nitida* Liljeborg, 1853 and *X. rubens* Whittaker, 1978).

Neotype: (here designated). Brit. Mus. (Nat. Hist.) no. 1977.19; ♀ RV, from a slide labelled *X. aurantia* in the A. M. Norman coll. (ex-slide no. 1900 - 3 - 6 - 323).

Explanation of Plate 5, 28

Fig. 1, ♀ car., ext. lt. lat. (1977.15, 470 µm long); fig. 2, ♂ car., ext. lt. lat. (1977.16, 380 µm long); fig. 3, ♂ copulatory appendages, vent. view (1977.17, ♂ car., 400 µm long).
 Scale A (200 µm; x 150), figs. 1, 2; scale B (25 µm; x 600), fig. 3.

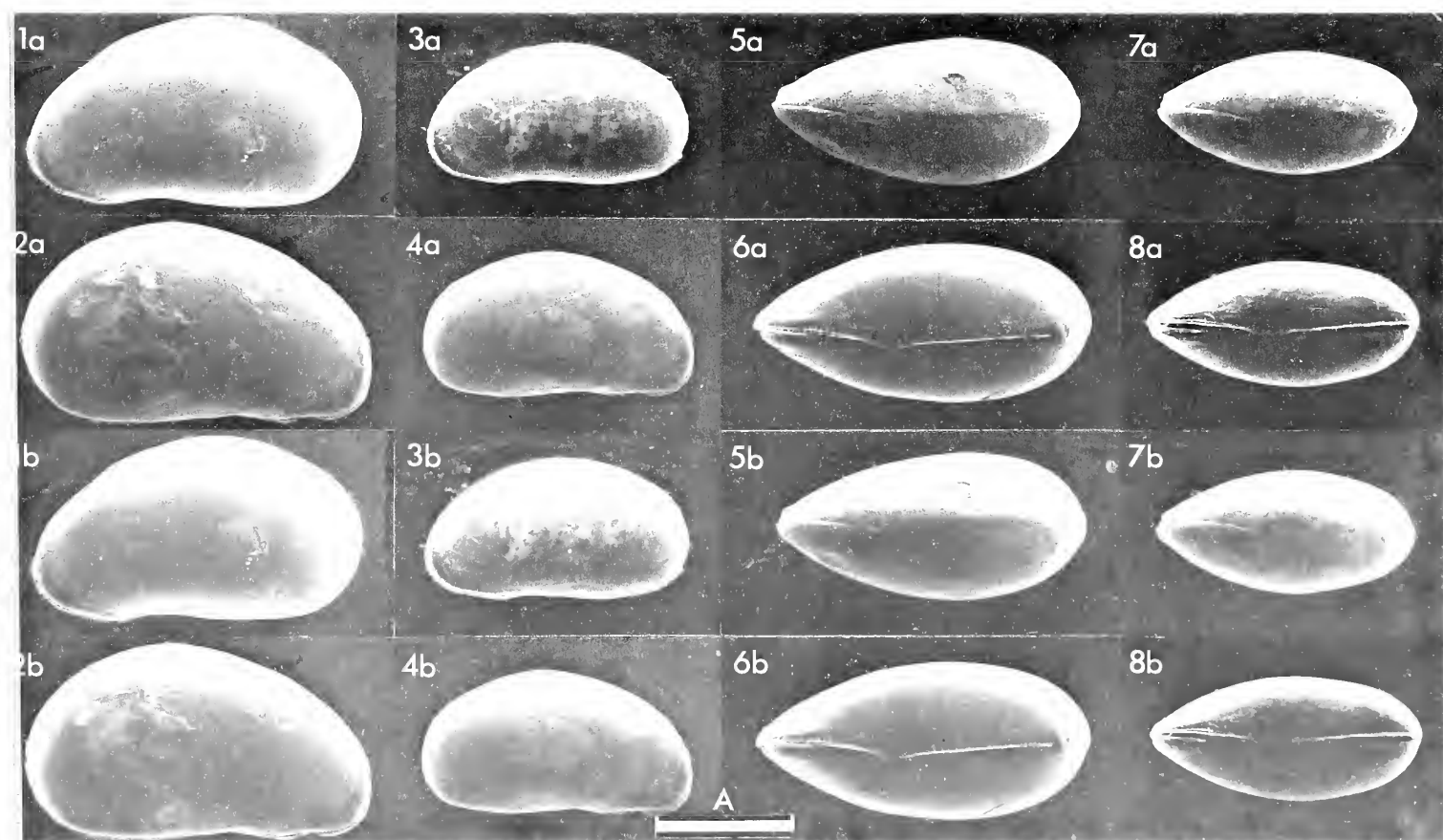
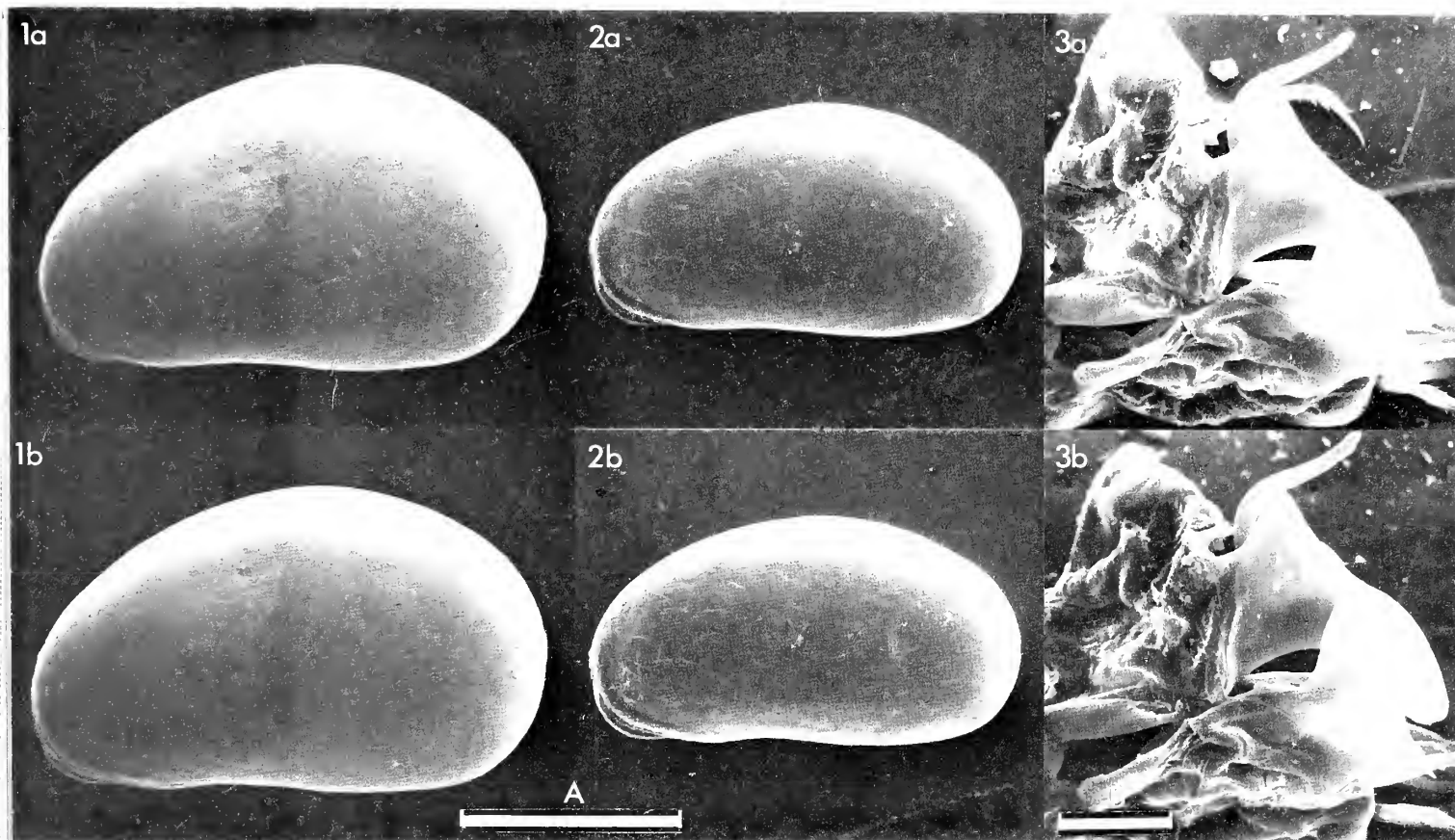
Type locality: Scarborough, NE England, approx. lat. 54° 15'N, long. 0° 20'W. Recent.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. 1977.15 (♀ car.: Pl. 5, 28, fig. 1), 1977.16 (♂ car.: Pl. 5, 28, fig. 2), 1977.17 (♂ car.: Pl. 5, 28, fig. 3), 1977.18 (♀ LV: Pl. 5, 30, fig. 1), 1977.19 Neotype (♀ RV: Pl. 5, 30, fig. 2), 1977.20 (♂ LV: Pl. 5, 30, fig. 3), 1977.21 (♂ RV: Pl. 5, 30, fig. 4; Pl. 5, 34, fig. 2), 1977.22 (♀ car.: Pl. 5, 30, fig. 5), 1977.23 (♀ car.: Pl. 5, 30, fig. 6), 1977.24 (♂ car.: Pl. 5, 30, fig. 7), 1977.25 (♂ car.: Pl. 5, 30, fig. 8), 1977.26 (♀ RV: Pl. 5, 32, figs. 1, 2, 4), 1977.27 (♀ LV: Pl. 5, 32, figs. 3, 5, 6), 1977.28 (♀ RV and soft parts: Pl. 5, 34, fig. 1), 1977.29 (♀ RV: Pl. 5, 34, fig. 3), 1977.30 (♂ LV: Pl. 5, 34, fig. 4), 1977.108 (♂ copulatory appendages: Text-fig. 1).

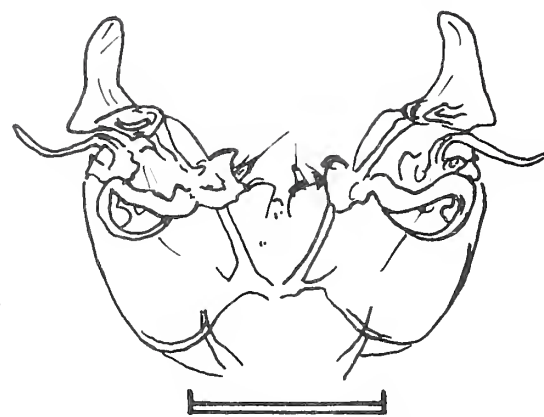
1977.15 - 18, 20 - 30, 108, were collected alive by J. E. Whittaker from green-algae, *Corallina* and *Fucus* with epiphytes, at various times (viz. August 1968; March, May and August 1969) in rock-pools at Osmington Mills, Weymouth Bay, S England, approx. lat. 50° 38'N, long. 02° 23'W; water temperature 5 - 19 °C, salinity 33 - 34‰. 1977.19 was collected alive from rock-pools at the type locality by the Rev. A. M. Norman in 1881.

Explanation of Plate 5, 30

Fig. 1, ♀ LV, ext. lat. (1977.18, 480 µm long); fig. 2, ♀ RV, ext. lat. (neotype, 1977.19, 490 µm long); fig. 3, ♂ LV, ext. lat. (1977.20, 390 µm long); fig. 4, ♂ RV, ext. lat. (1977.21, 380 µm long); fig. 5, ♀ car., ext. dors. (1977.22, 450 µm long); fig. 6, ♀ car., ext. vent. (1977.23, 480 µm long); fig. 7, ♂ car., ext. dors. (1977.24, 370 µm long); fig. 8, ♂ car., ext. vent. (1977.25, 390 µm long).
 Scale A (200 µm; x 95), figs. 1 - 8.



Diagnosis: Adults strongly dimorphic, males (260 - 420 μ m long) much smaller than females (420 - 500 μ m long), and more elongate. Shell moderately compressed in dorsal view; in lateral view, sub-reniform, dorsal margin rounded, ventral margin with oral concavity and flange-like overlap by RV antero-ventrally. Venter sub-rounded. Opaque area small, just behind "*Xestoleberis* - spot". Postero-ventral marginal pore canals straight and short. Shape of terminal lappets of male copulatory appendages distinctive with long external projection of *ductus ejaculatorius*. Living specimens usually with yellowish-orange pigmentation or whitish.



Text-fig. 1, ♂ copulatory appendages (scale = 100 μ m; 1977.108).

Remarks: *Cythere aurantia* was first described by Baird from Berwick Bay, NE England, along with four other marine, phytal species *C. lutea* O. F. Müller (as *C. reniformis*), *C.* (now *Heterocythereis*) *albomaculata*, *C.* (now *Semicytherura*) *nigrescens* and *C.* (now *Paradoxostoma*) *variabile*, which suggests his sampling place was in the littoral zone, probably a rock-pool. As the types are not with the remaining part of the Baird Collection in the B.M. (N.H.), the neotype has been chosen carefully to correspond with his description of 1838.

Explanation of Plate 5, 32

Figs. 1, 2, 4, ♀ RV, int. lat. (1977.26, 430 μ m long): fig. 1, int. lat.; fig. 2, ant. hinge; fig. 4, post. hinge. Figs. 3, 5, 6, ♀ LV, int. lat. (1977.27, 460 μ m long): fig. 3, post. hinge; fig. 5, ant. hinge; fig. 6, musc. sc.
Scale A (100 μ m; x 140), fig. 1; scale B (50 μ m; x 240), figs. 2 - 5; scale C (25 μ m; x 450), fig. 6.

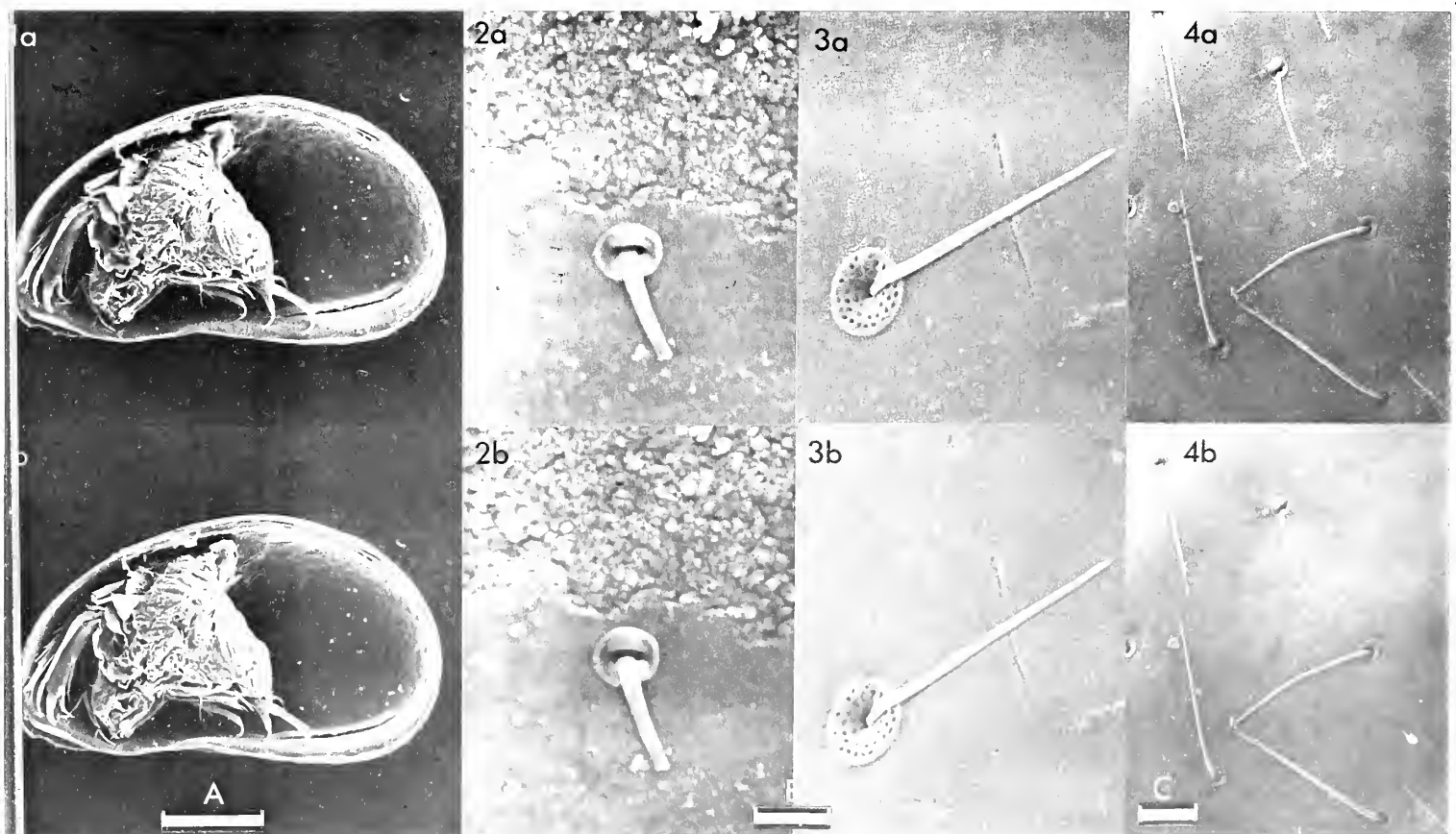
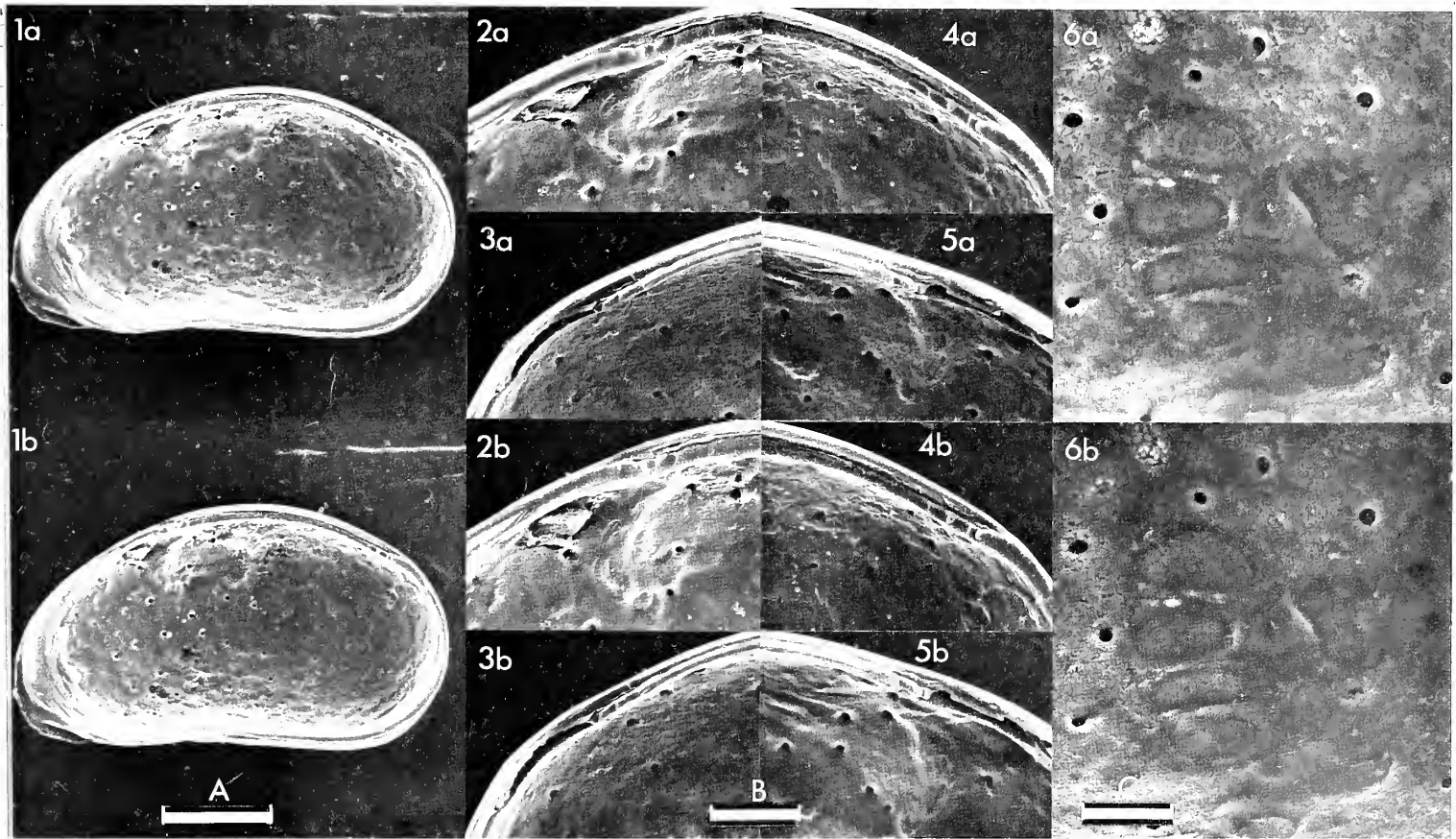
Remarks: (contd.) As the original illustration was poor and probably because many species of *Xestoleberis* look superficially alike, a number of different forms, both fossil and Recent, from all over the world, have been "lumped" together as *X. aurantia*. In NW Europe, the name would now appear to include two common species [i.e. *X. aurantia sensu* Sars, 1928, and *X. aurantia sensu* Brady, 1868 (= *X. pusilla* Elofson, 1941)]. A third species, *X. rubens* Whittaker, 1978 (*Stereo-Atlas of Ostracod Shells*, 5, 35 - 44, 1978), has also been confused with *X. aurantia* in this area, but its distribution is at present poorly known; it is not discussed further in this paper.

After an examination of the Brady and the Norman Collections in the B.M. (N.H.) and Hancock Museums, I am confident that Brady's 1868 concept of the species must be the true *X. aurantia* (Baird). *X. aurantia sensu* Sars, 1928 differs from Baird's description in being too large to be classed as "very minute"; in being subtriangular with an unbinate dorsal margin, rather than reniform with a rounded dorsal margin, and in having white pigmentation instead of yellowish orange. Furthermore, it has never been found in wholly marine environments. Of all the slides in these two collections labelled *X. aurantia*, none from marine localities in Britain and elsewhere in NW Europe, contain the larger form, a factor most surprising when one considers that Brady & Norman, when designating the type-species in 1889 (*Scient. Trans. R. Dubl. Soc.* ser. 2, 5, 188), declared the two to be synonymous, a statement followed by Sars, 1928, and most subsequent authors. *X. aurantia* (Baird) is illustrated and redescribed herein, while the name *X. nitida* (Liljeborg, 1853) is rehabilitated for the other species (see *Stereo-Atlas of Ostracod Shells*, 5, 17 - 26, 1978).

Distribution: Records can be confirmed from numerous localities around the coasts of Great Britain and Ireland and as far north as W Norway [B.M. (N.H.) and Hancock Museum Collections]. It has been recorded as *X. pusilla* Elofson in the Skagerrak (Elofson, 1941) and Roscoff Bay, Brittany (de Vos, 1957). Other Recent records, together with the stratigraphical range of *X. aurantia* now need careful revision.

Explanation of Plate 5, 34

Fig. 1, ♀ RV, int. lat. showing soft parts (1977.28, 430 μ m long); figs. 2 - 4, pore types: fig. 2, funnel-shaped simple pore, mid vent. region (1977.21); fig. 3, sieve-type pore, post. dors. region (1977.29, ♀ RV, 470 μ m long); fig. 4, simple and sieve-type pores, ant. vent. region (1977.30, ♂ LV, 380 μ m long).
Scale A (100 μ m; x 140), fig. 1; scale B (5 μ m; x 2,000), figs. 2, 3; scale C (10 μ m; x 675), fig. 4.



ON *XESTOLEBERIS RUBENS* WHITTAKER sp.nov.

by John E. Whittaker

(British Museum (Natural History), London)

Xestoleberis rubens sp. nov.

- 1957 *Xestoleberis aurantia* (Baird); A. P. C. de Vos, *Archs. Zool. exp. gén.* **95** (n. ser. 8), 48, pl. 18, fig. 4a; pl. 19, figs. 4a - d; pl. 20, figs. 1a - e. (*non Cythere aurantia* Baird, 1838).
- 1969 *Xestoleberis aurantia* (Baird); I. Yassini, *Bull. Inst. Géol. Bassin Aquitaine*, **7**, 125 (*pars*), pls. 5 - 7 (*pars*), 9 (*pars*), 11 - 13, 15 (*pars*). (*non C. aurantia* Baird).

Holotype: Brit. Mus. (Nat. Hist.) no. **1977.31**; ♀ car.

Type locality: Bridging Point, The Narrows, E Fleet, Dorset, S England, approx. lat. 50° 36'N, long. 2° 29'W; Recent.

Derivation of name: From the Latin adj. meaning "ruddy" or "blushing"; refers to the beautiful red-brown pigmentation (see Text-fig. 2).

Explanation of Plate 5, 36

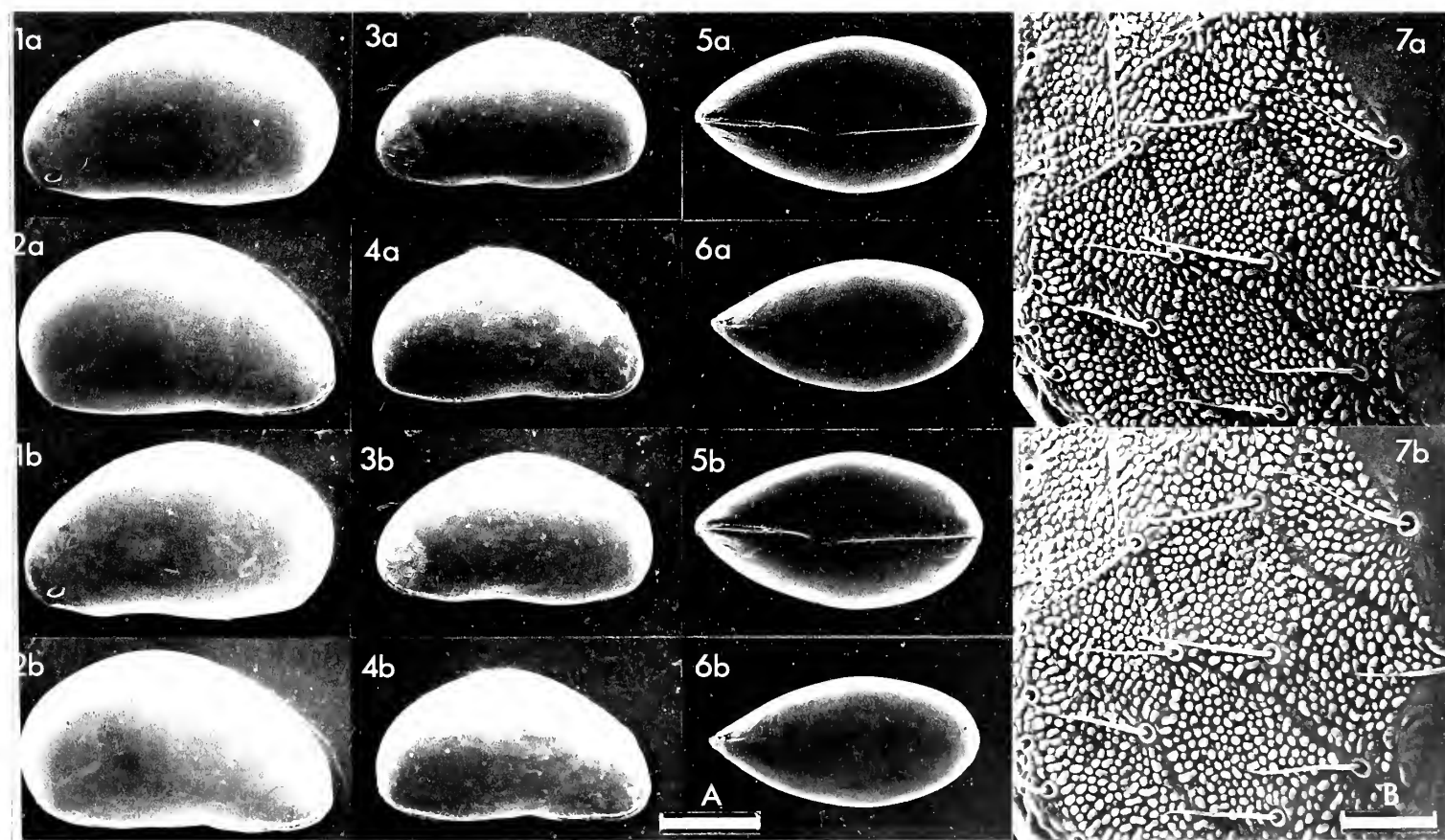
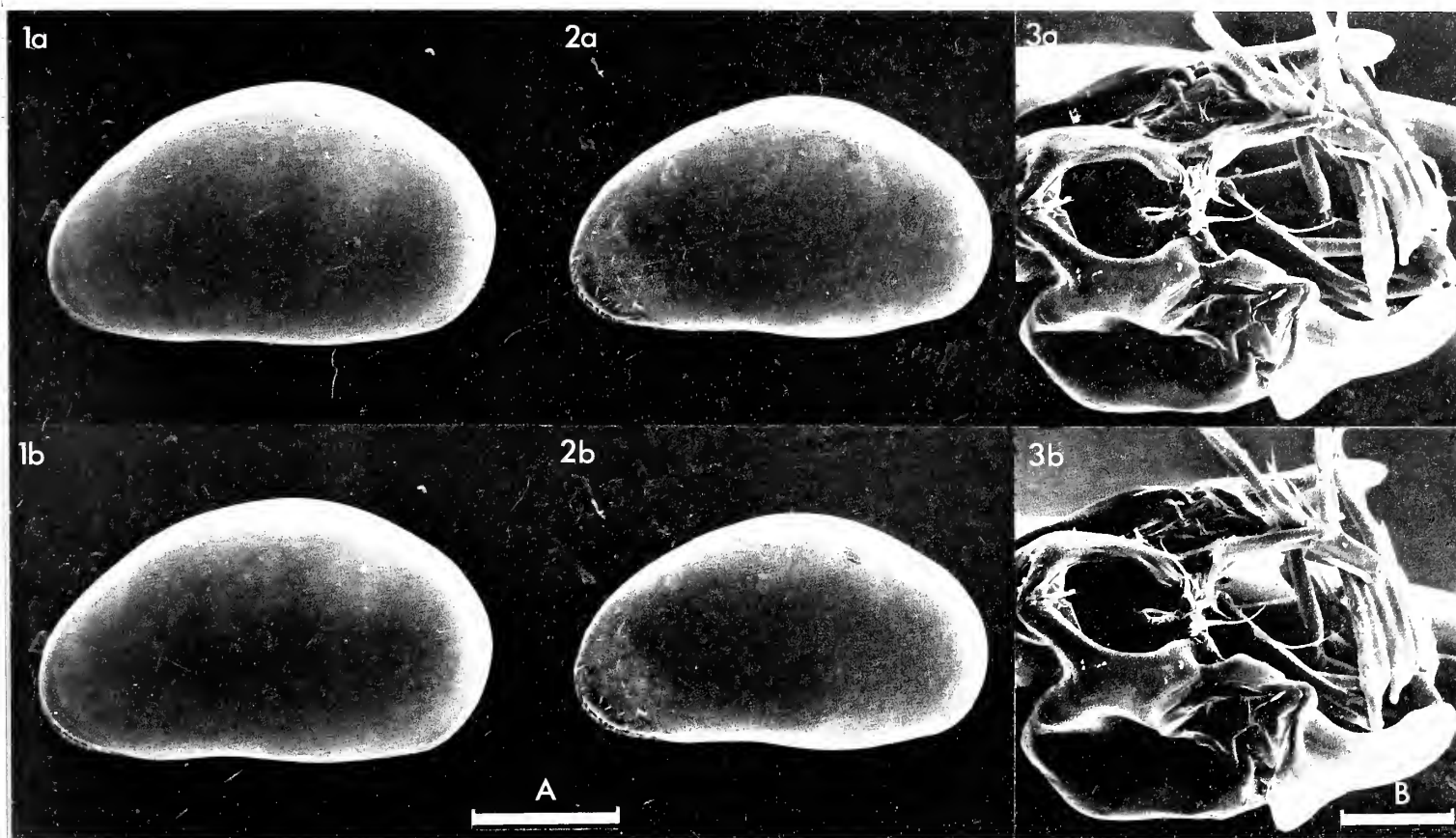
Fig. 1, ♀ car., ext. lt. lat. (holotype, **1977.31**, 620 µm long); fig. 2, ♂ car., ext. lt. lat. (**1977.32**, 560 µm long); fig. 3, ♂ copulatory appendages, vent. view (**1977.33**, ♂ car., 570 µm long).
Scale A (200 µm; x 100), figs. 1, 2; scale B (50 µm; x 280), fig. 3.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. **1977.31** Holotype (♀ car.: Pl. 5, 36, fig. 1), **1977.32** (♂ car.: Pl. 5, 36, fig. 2), **1977.33** (♂ car.: Pl. 5, 36, fig. 3), **1977.34** (♀ LV: Pl. 5, 38, fig. 1), **1977.35** (♀ RV: Pl. 5, 38, fig. 2; Pl. 5, 42, fig. 2), **1977.36** (♂ LV: Pl. 5, 38, figs. 3, 7), **1977.37** (♂ RV: Pl. 5, 38, fig. 4), **1977.38** (♀ car.: Pl. 5, 38, fig. 5), **1977.39** (♂ car.: Pl. 5, 38, fig. 6), **1977.40** (♀ LV: Pl. 5, 40, fig. 3), **1977.41** (♀ RV: Pl. 5, 40, figs. 1, 2, 4), **1977.42** (♀ LV and soft parts: Pl. 5, 40, fig. 5; Pl. 5, 42, fig. 4), **1977.43** (♀ LV: Pl. 5, 42, fig. 1), **1977.44** (♂ LV: Pl. 5, 42, fig. 3), **1977.109** (♂ copulatory appendages: Text-fig. 3), **1977.110** (♀ car.: Text-fig. 2), **1977.111** (♀ LV: Text-fig. 1).

All specimens were collected alive by J. E. Whittaker. **1977.31, 33 - 35, 38 - 42, 111**, were collected on 4.8.1969 from green and red algae in the littoral zone at the type locality; salinity 35‰, water temperature 22°C. **1977.43, 44**, are also from the type locality, collected 13.8.1968, on red algae; salinity 34‰, water temperature 19°C. **1977.32, 109.110**, are from the green alga *Enteromorpha*, collected 25.10.1975 at Chickerell Hive Point, 1km to the NW of the type locality, E Fleet; salinity 32‰. **1977.36, 37** are from La Teste de Buch, S Arcachon Basin, SW France; approx. lat. 44° 39'N, long. 1° 09'W; on *Enteromorpha*.

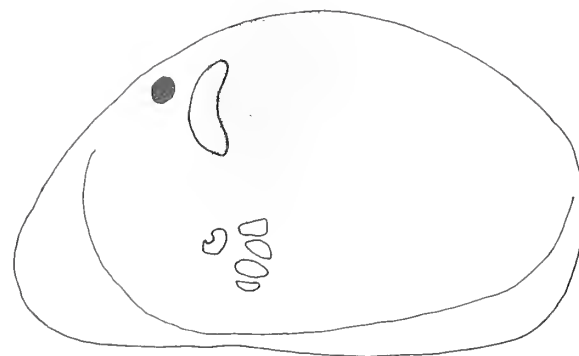
Explanation of Plate 5, 38

Fig. 1, ♀ LV, ext. lat. (**1977.34**, 640 µm long); fig. 2, ♀ RV, ext. lat. (**1977.35**, 640 µm long); fig. 3, ♂ LV, ext. lat. (**1977.36**, 530 µm long); fig. 4, ♂ RV, ext. lat. (**1977.37**, 530 µm long); fig. 5, ♀ car., ext. vent. (**1977.38**, 630 µm long); fig. 6, ♂ car., ext. dors. (**1977.39**, 560 µm long); fig. 7, ♂ LV, detail of ant. vent. ornament (**1977.36**).
Scale A (200 µm; x 65), figs. 1 - 6; scale B (25 µm; x 500), fig. 7.





Text-fig. 1, ♀ LV, vent., transmitted light, to show branching marginal pore canals (1977.111).



Text-fig. 2, ♀ car., lt. lat., transmitted light, to show opaque area, eye, "Xestoleberis - spot", muscle scars and marginal zone. In life, the species is red-brown in colour, except for the opaque area and marginal zone, which is buff (1977.110).

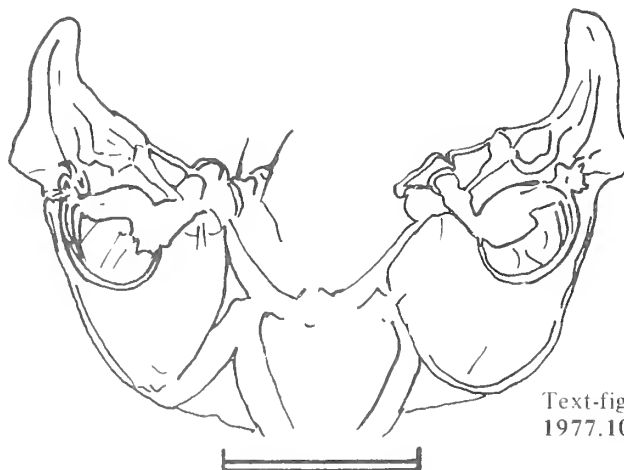
(Scale = 100 μ m; Text-figs. 1, 2).

Explanation of Plate 5, 40

Figs. 1, 2, 4, ♀ RV, int. lat. (1977.41, 630 μ m long): fig. 1, ant. hinge; fig. 2, post. hinge; fig. 4, int. lat. Fig. 3, ♀ LV, musc. sc. (1977.40, ♀ LV, 630 μ m long). Fig. 5, ♀ LV, int. lat. (1977.42, 650 μ m long) showing soft parts with juvs. (-7), eggs and/or nauplii inside "brood chamber" (marsupium).

Scale A (50 μ m; x 200), figs. 1, 2; scale B (50 μ m; x 300), fig. 3; scale C (200 μ m; x 80), figs. 4, 5.

Diagnosis: Adults 520 - 700 μ m long; dimorphic, males more elongate and smaller than females. Shell moderately inflated in dorsal aspect: in lateral view sub-reniform with rounded dorsal margin and distinctive ventral sinuosity. Venter rounded. Antero-ventral area of male right valve with pustulose ornament. Opaque area saddle shaped. Postero-ventral marginal pore canals long and branching. Terminal lappets of male copulatory appendages with distinctive outline. In life, shell has predominantly red-brown pigmentation.

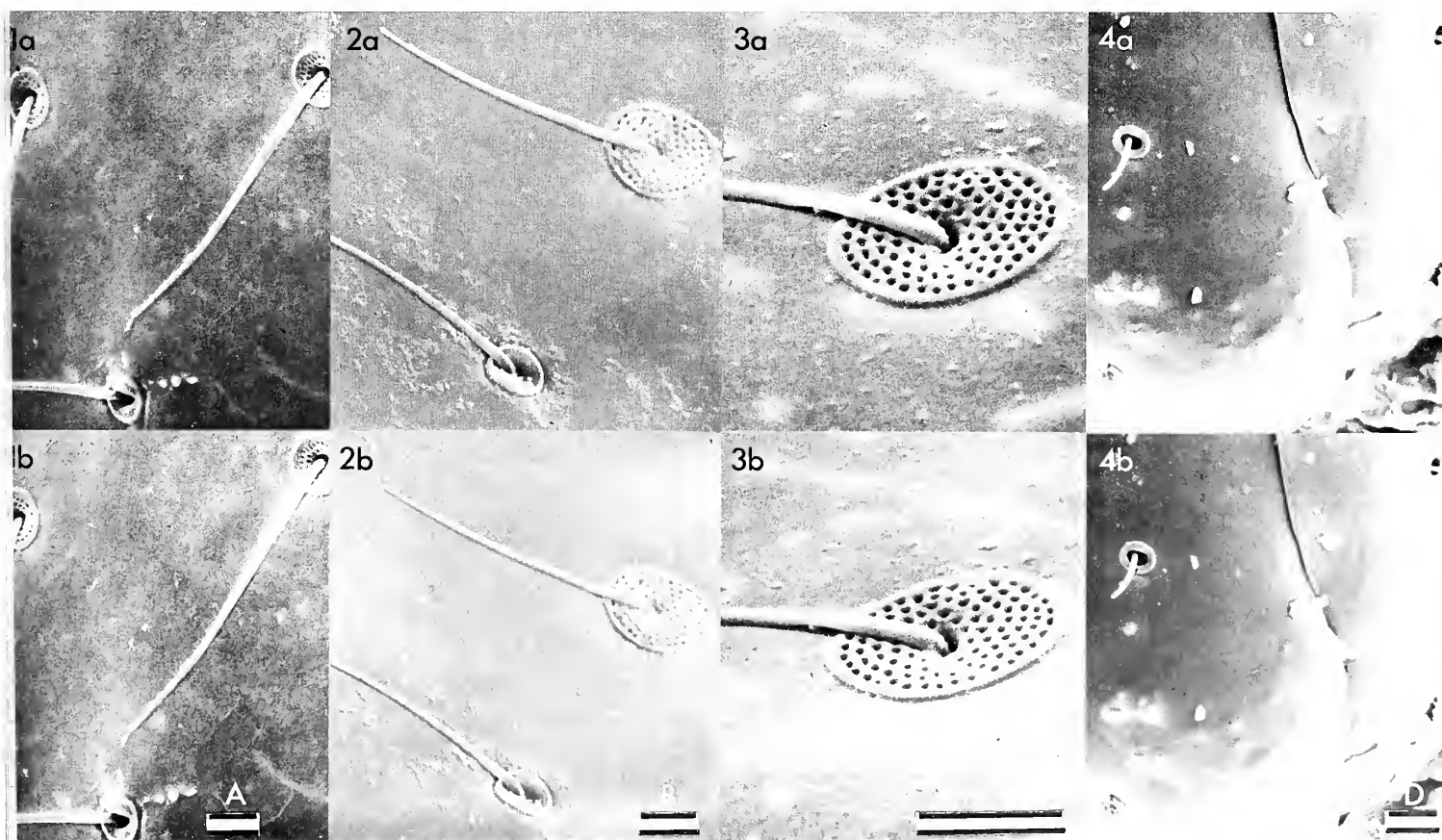
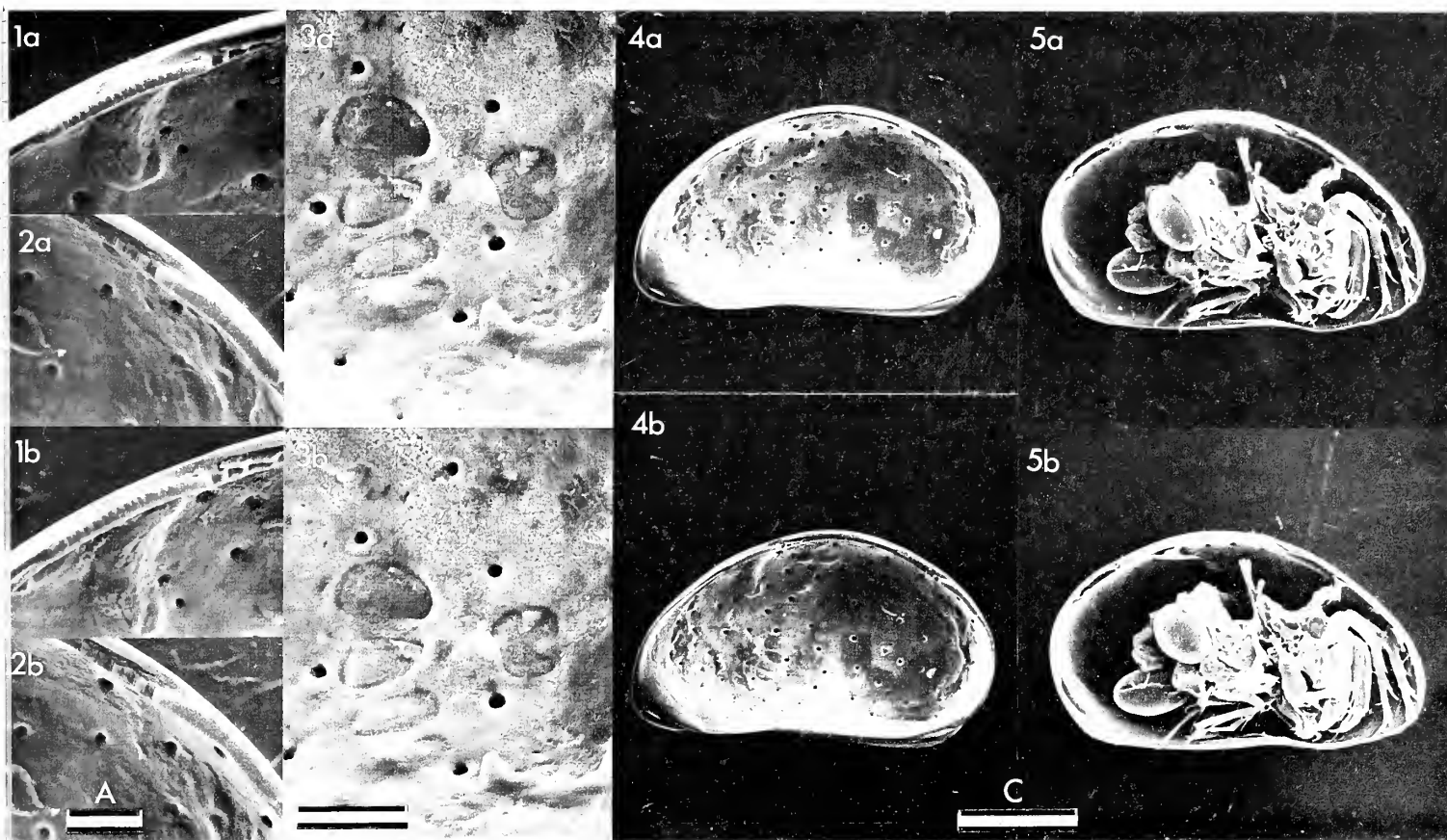


Text-fig. 3, ♂ copulatory appendages (scale = 100 μ m; 1977.109).

Explanation of Plate 5, 42

Figs. 1 - 4, pore types: fig. 1, funnel-shaped simple- and sieve-type pores, ant. vent. region (♀ LV, 1977.43); fig. 2, funnel-shaped simple pore and flush sieve pore, ant. dors. region (♀ RV, 1977.35); fig. 3, flush sieve pore, ant. dors. region (♂ LV, 1977.44); fig. 4, funnel-shaped simple- and sieve-type pores in juv. (-7), ant. dors. region (uppermost instar in ♀ marsupium, Pl. 5, 40, fig. 5, 1977.42).

Scale A (5 μ m; x 1,300), fig. 1; scale B (5 μ m; x 1,500), fig. 2; scale C (5 μ m; x 3,900), fig. 3; scale C (5 μ m; x 1,200), fig. 4.



Remarks: *X. rubens* is the commonest ostracod in the phytal assemblages of the marine E Fleet, S England, especially in summer and autumn months. The females carry eggs and small juveniles within their carapaces ("marsupium") at all times of the year and it would appear that reproduction is continuous. After moulting to the (- 6) stage, the juveniles leave the mother's carapace, as no later stages than the (- 7), the first with calcareous valves (see Pl. 5, 40, fig. 5) have been found inside the female. In the brackish W Fleet, *X. rubens* is gradually replaced by *X. nitida* (Liljeborg) (see *Stereos-Atlas of Ostracod Shells*, 5, 17 - 26, 1978), while in Weymouth Bay, to which the lagoonal Fleet is connected, the new species is replaced, this time by *X. aurantia* (Baird) (see *Stereos-Atlas of Ostracod Shells*, 5, 27 - 34, 1978); in spite of similar ecological conditions, only a few individuals have ever been found in Weymouth Bay, no more than a few kilometres to the E of this remarkably localised population.

Distribution: No specimens of this distinctive species were found during a thorough examination of the B.M. (N.H.) and Hancock Museum Collections of *Xestoleberis*, either from Britain or elsewhere. From a close comparison of the shell characteristics and male copulatory organ figured by de Vos (1957), under the name *X. aurantia*, it is clear that *X. rubens* is also found at Roscoff, Brittany. Furthermore, I have collected it at several stations in the Arcachon Basin, SW France (illustrated herein); Yassini (1969) only refers to *X. aurantia*, but I found both *X. rubens* and *X. nitida* in his material at the Univ. of Bordeaux and in my Arcachon samples, while Baird's species did not occur. Athersuch, Hartmann, Neale and Wouters (pers. comms.) all report that they have not found *X. rubens* in the Mediterranean, or elsewhere in Europe for that matter.

ON *KARINUTATIA CRUX* SCHALLREUTER gen. et sp. nov.

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Genus *KARINUTATIA* gen. nov.

Type-species: *Karinutatia crux* sp. nov.

Derivation of name: In honour of my wife Karin Uta, for her encouragement with my ostracod studies. Gender, feminine.

Diagnosis: A member of the Monotiopleuridae (Kloedenellacea, Platycopa) with subamplete outline; posterior cardinal angle slightly greater than 90°, anterior cardinal angle considerably larger, hinge-line much shorter than valve length, anterior valve margin rounded in lateral view. Sulcus tiny, pit-like, distinctly anterior of mid-length, slightly dorsal of mid-height. Female relatively higher and posteriorly wider than male, with two rounded, internal, posterior depressions, one beneath the other. Shell reticulate, longitudinal 'ribs' more prominently developed than cross elements.

Remarks: Of all other known monotiopleurids only *Foveaprimitiella* Schallreuter, 1972 has a similar pit-like sulcus (cf. Guber & Jaanusson, *Bull. geol. Instn. Univ. Upsala* 43 (1/3), 2, 1965 = *Publ. Palaeont. Instn. Univ. Upsala* 53, 1964; Schallreuter, *Wiss. Z. Univ. Greifswald* 17 (1/2) 1968 & 21 (2) 1972). *Foveaprimitiella* differs in having a smaller anterior cardinal angle, a more centrally placed adductor pit and a more symmetrical outline (in lateral view the anterior and posterior valve margins extend about equal amounts beyond the hinge line). Furthermore, *Foveaprimitiella* has only valve surface reticulation, whereas the new genus shows a much more pronounced shell reticulation.

Explanation of Plate 5, 46

Fig. 1, ♂ RV, ext. lat. (GPIH 1982, 640 µm long); fig. 2, ♀ LV, ext. lat. (holotype, GPIH 1983, 635 µm long).
Scale A (100 µm; x 145), figs. 1, 2.

Remarks: In its shell reticulation and sulcal pit morphology *Karinutatia* strongly resembles *Martinssonozona* (contd.) Schallreuter, 1968 and it appears to represent an intermediate form between the dimorphic monotiopleurids and the non-dimorphic Kirkbyacea. The morphology of *Karinutatia* therefore suggests that the Kirkbyacea descended from non-dimorphic monotiopleurids and that the Kirkbyacea and the platycopes are closely related (cf. Schallreuter, 129, 1968). Besides the absence of sexual dimorphism *Martinssonozona* differs from *Karinutatia* by its more symmetrical outline.

Karinutatia crux sp. nov.

Holotype: Geologisch-Paläontologisches Institut, University of Hamburg, no. 1983 ♀ LV.

Type locality: Isle of Gotland, beach opposite the Isle of Lilla Karlsö (Baltic Sea); lat. 57° 18' N, long. 18° 8' E. Backsteinkalk erratic boulder (14B2 Type, no. G31), Middle Ordovician.

Derivation of name: Latin, *crux*, cross; alluding to the normally cross-like lumina of the shell reticulation.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg, nos. 1982 (♂ RV: Pl. 5, 46, fig. 1; Pl. 5, 48, fig. 2), 1983 (♀ LV: Pl. 5, 46, fig. 2; Pl. 5, 48, figs. 1, 4), 1984 (♀ RV: Pl. 5, 48, fig. 3). All from Backsteinkalk erratic boulder no. G31 (for further data see type locality); coll. by the author in 1976.

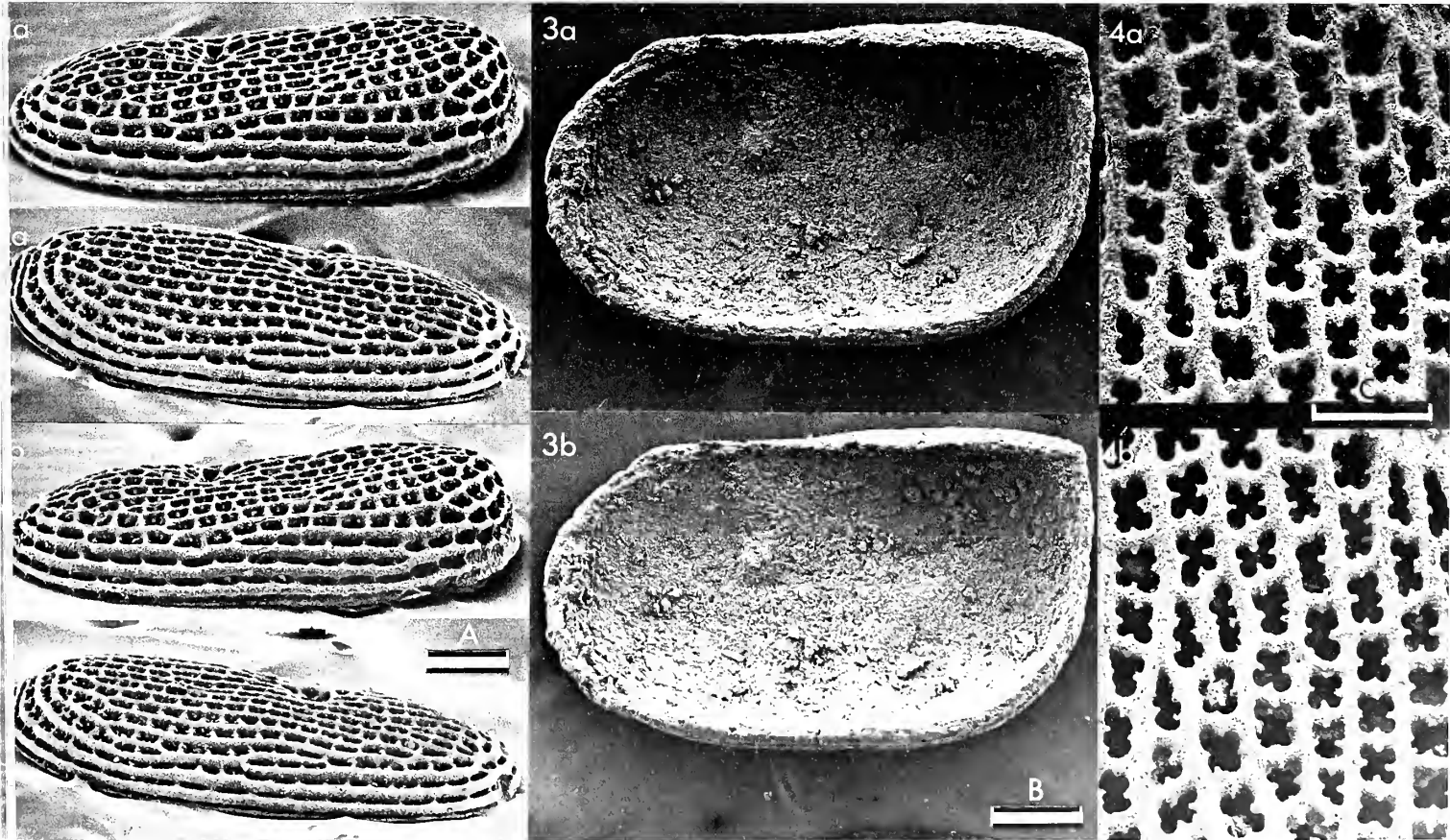
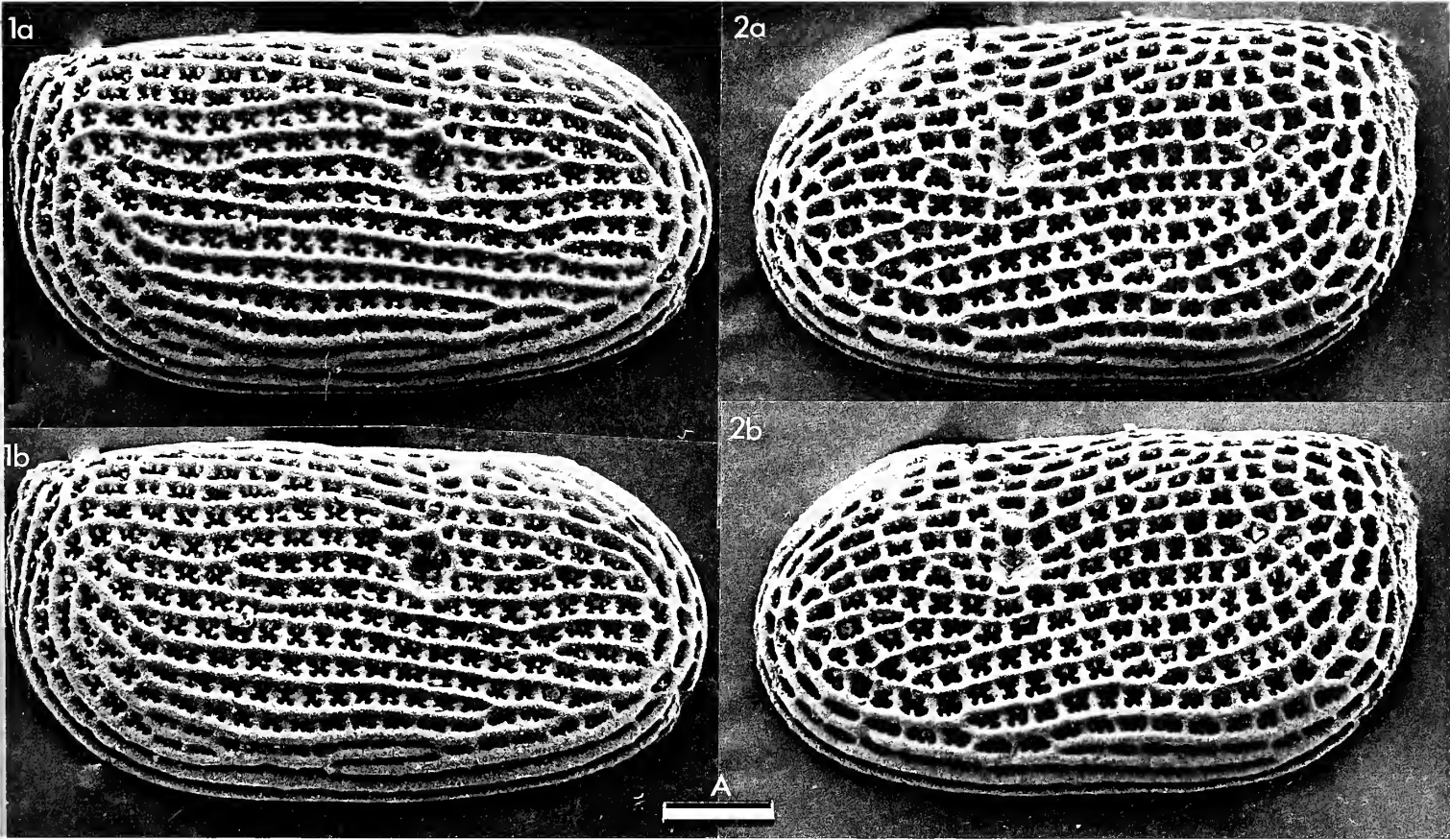
Diagnosis: As for the genus.

Remarks: Similar rounded depressions on the inner side of the posterior third of the presumed female valve occur also in other platycopes such as *Cytherelloidea* (for example, see Bischoff, *Senckenberg. leth.* 45, 17, pl. 3, fig. 20a, 1964) and *Lomatopisthia* (Guber & Jaanusson, op. cit., pl. 4, figs. 9, 11).

Distribution: Known only from the type locality.

Explanation of Plate 5, 48

Figs. 1, 4, ♀ LV (holotype, GPIH 1983): fig. 1, ext. vent. obl.; fig. 4, ext. lat., detail showing shell reticulation. Fig. 2, ♂ RV, ext. vent. obl. (GPIH 1982); fig. 3, ♀ RV, int. lat. (GPIH 1984, 610 µm long).
Scale A (100 µm; x 110), figs. 1, 2; scale B (100 µm; x 123), fig. 3; scale C (50 µm; x 300), fig. 4.



DUPLICRISTATIA ASYMMETRICA SCHALLREUTER gen. et sp. nov.

by Roger E. L. Schallreuter

(University of Hamburg, German Federal Republic)

Genus *DUPLICRISTATIA* gen. nov.Type-species: *Duplicristatia asymmetrica* sp. nov.*Derivation of name:* Latin, *duplex*, dual; alluding to the two main cristae of the lateral surface.

Diagnosis: A genus of Budnianellidae with tricorninid-like outline. Strongly convex, domicilium broadest centrally, anterior and posterior areas relatively flat. Anterior half of left valve dorsal border has \pm broad, long, flange-like stragulum. Lateral surface with two cristae and numerous finer, parallel ridges; dorsal crista of left valve and ventral crista of right valve extend to dorsal border. A narrow, adventral flange- or keel-like structure occurs near the free margin except centroventrally; here, in both valves, 'bow-shaped' projections are developed. Two short stop-ridges in internal ventral part of left valve. No inner lamella.

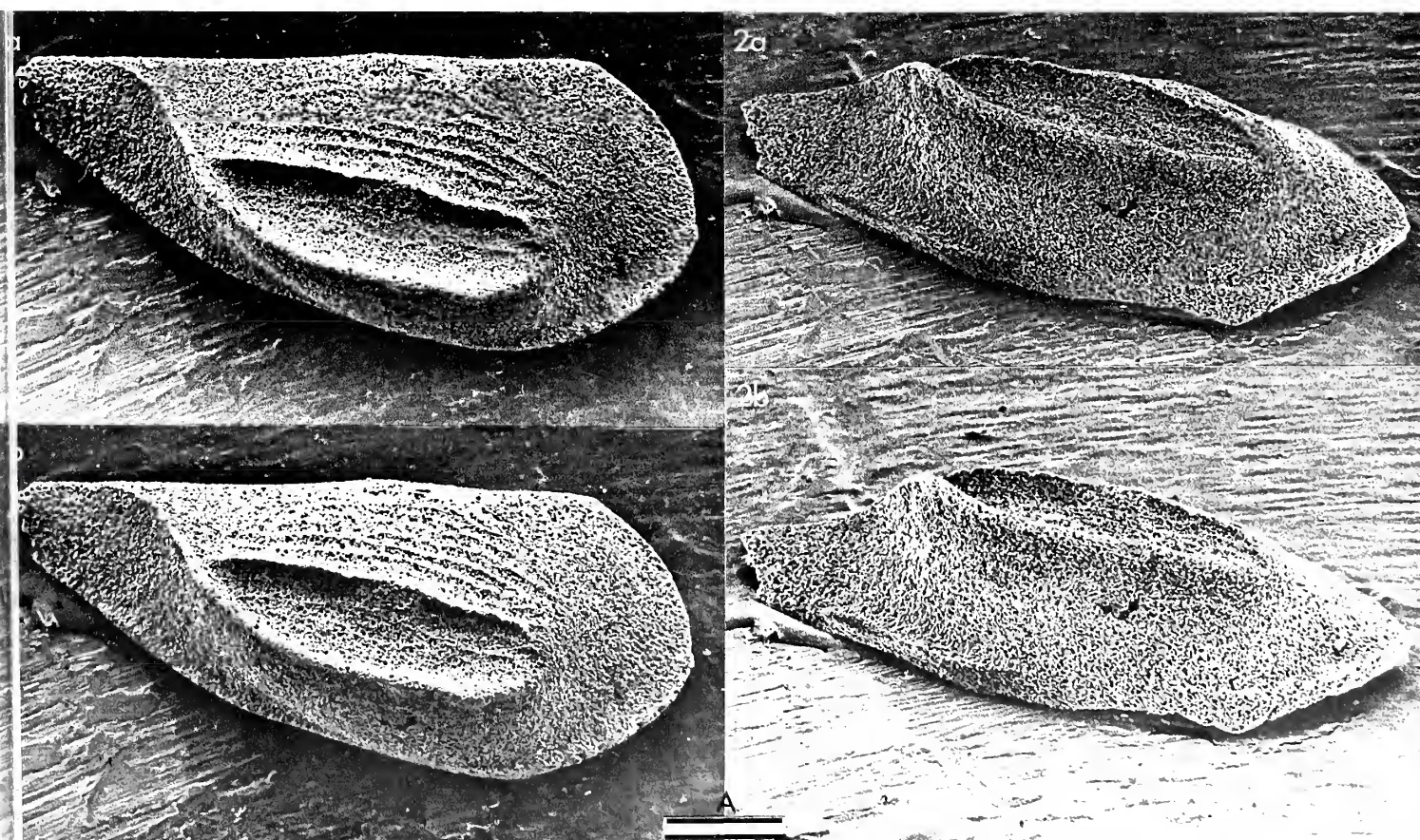
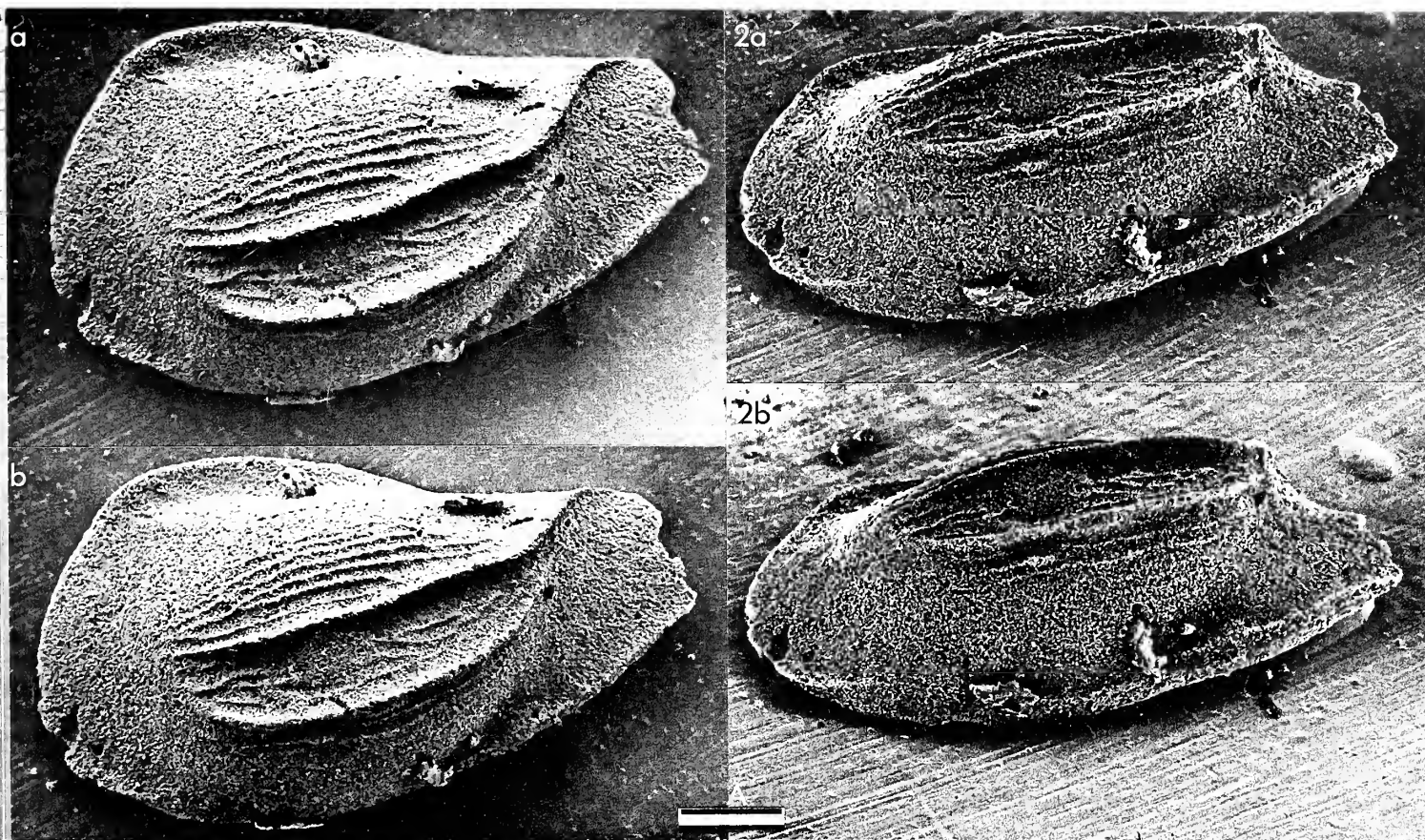
Explanation of Plate 5, 50Figs. 1, 2, LV (holotype, GPIH 1985, 635 μ m long); fig. 1, ext. lat.; fig. 2, ext. vent. obl.Scale A (100 μ m; x 140), figs. 1, 2.

Remarks: *Brevicornina* Gründel & Kozur is closely similar to *Duplicristatia* but differs mainly by its convexity (domicilium broadest ventrally) and by the occurrence of only one, ventral crista, which in lateral view can over-hang the ventral margin (*Mber. DT. Akad. Wiss. Berlin* 13 (10/12, 1972). It is possible to recognise another new genus based on the material described under *Budnianella shenandoahense* by Kraft (*Mem. geol. Soc. Am.* 86, Sept. 1962; non *Budnianella shenandoahense* Swain, *J. Paleont.* 36 (4), 735, July 1962; but see also Sohn, *Science* 159, 441, 1968). The new genus would be characterized by an amplete outline, broadest width in the ventral half of the domicilium and the development of only one crista in the ventral half of the valve (Swain, op. cit., pl. 110, figs. 5a - e; Kraft, op. cit., pl. 16, figs. 1, 2; Blumenstengel, *Freiberger ForschHft. ser. C* 182, text-fig. 20, 1965; Knüpfer, *ibid.* 234, pl. 5, fig. 2a, 1968).

The Silurian genus *Budnianella* Bouček (*Neus. Jb. Miner Geol. Paläont. BeilBd.* 76 (1) 1936) is easily distinguished. It has a \pm amplete outline, a domicilium which is broadest in the dorsal half, and a lack of cristae.

Duplicristatia seems to be closely related to other genera in addition to *Brevicornina*, a genus which Gründel & Kozur (op. cit., 909) considered to be a primitive member of the Tricorninidae Blumenstengel, 1965. The tricorninid-like outline, the stragulum, and especially the occurrence of stop-ridges in the left valve demonstrate that *Duplicristatia* has affinities with *Steusloffina* Teichert, 1937, a genus which Schallreuter referred to the Tricorninidae (*Wiss. Z. Univ. Greifswald* 17 (1/2), 1968). By contrast Gründel & Kozur (*Freiberger ForschHft. ser. C*, 282, 1973) consider that *Steusloffina* is not directly related to the Tricorninidae, a possible assignment, also questioned by Hessland & Adamczak when remarking "that the bow-shaped projections on both valves are of fundamental importance in establishing the taxonomic relationships of *Steusloffina*" (*Geosci. Man* 6, 1974).

Explanation of Plate 5, 52Figs. 1, 2, RV (GPIH 1986, 585 μ m long); fig. 1, ext. lat.; fig. 2, ext. vent. obl.Scale A (100 μ m; x 160), figs. 1, 2.



Remarks: According to Gründel & Kozur *Tricornina* is equivalved (op.cit., 907, 1972), and Hessland & Adamczak (contd.) comment that, "the large overlap of the valves in *Steusloffina* are not observed in the nominative taxon *Tricornina*" (op. cit., 62). This may not, however, be true: examples which have a ventral bow-shaped projection are known (Schallreuter, *Neus. Jb. Geol. Paläont. Abh.* **150** (3), 274, 1975; Groos, *Göttinger Arb. Geol. Paläont.* **1**, tex-fig. 19, 7b, 1969). Although *Steusloffina* may not eventually prove to be a member of the Tricorninidae it is, however, apparently closer related to that family than has been considered by other authors.

Kraft (op. cit.) included two genera in the family Budnianellidae Swain (op. cit., cf. Sohn, op. cit.), *Budnianella* and *Platyrhomboides*. The latter was established by Harris (*Bull. Okla. geol. Surv.* **75**, 1957), who assigned it to the Beecherellidae. According to Schallreuter (*Neus. Jb. Geol. Paläont. Abh.* **131** (1), 82, 1968) this was correct, and the Budnianellidae were considered synonymous with the Beecherellidae. The Budnianellidae cannot, however, continue to be included with the Beecherellidae (Bairdiacea, Cypridocopa). The Beecherellidae possess a broad inner lamella which is unknown in the Budnianellidae. Moreover, the budnianellid *Duplicristatia* has stop-ridges, structures apparently typical for the Metacopa (Adamczak, *Senckenberg. leth.* **57** (4/6) 1976). The budnianellids may, along with *Steusloffina* (cf. Hessland & Adamczak, op. cit., 63) and the Tricorninidae, belong to the Metacopa.

Explanation of Plate 5, 54

Fig. 1, LV, ext. lat. (GPIH 1987, 570 μm long); fig. 2, LV, ext. dors. obl. (holotype, GPIH 1985).
Scale A (100 μm ; x 160), figs. 1, 2.

Duplicristatia asymmetrica sp. nov.

Holotype: Geologisch-Paläontologisches Institut, University of Hamburg, no. 1985, LV.

Type locality: Beach north of Lickershamn, Isle of Gotland (Baltic Sea); lat. 57° 49.5'N, long. 18° 30.5'E. Öjlemyrflint erratic boulder (no. G6), Upper Ordovician.

Derivation of name: Referring to the asymmetrical arrangement of the stragulum and cristae on the two valves of the carapace.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg, nos. 1985 (LV: Pl. 5, 50, figs. 1, 2; Pl. 5, 54, fig. 2), 1986 (RV: Pl. 5, 52, figs. 1, 2), 1987 (LV: Pl. 5, 54, fig. 1), 1988 (LV: Pl. 5, 56, fig. 1), 1989 (LV: Pl. 5, 56, fig. 2).

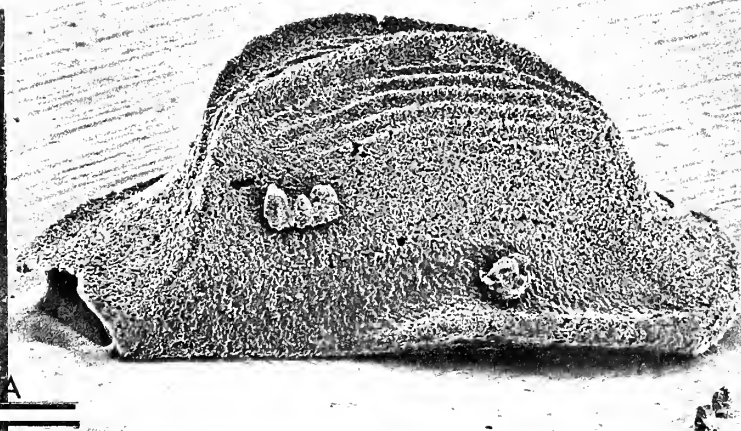
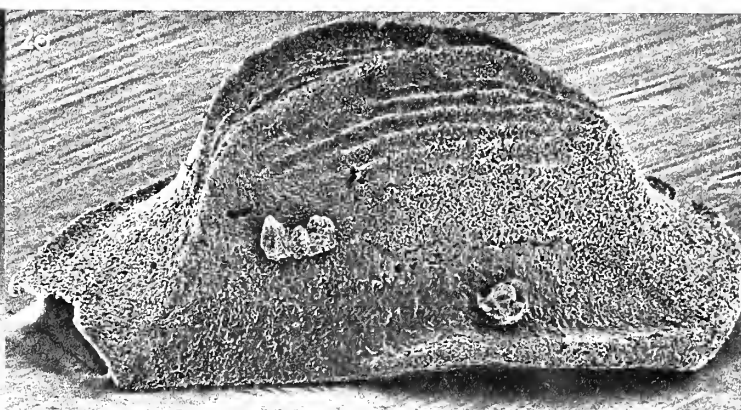
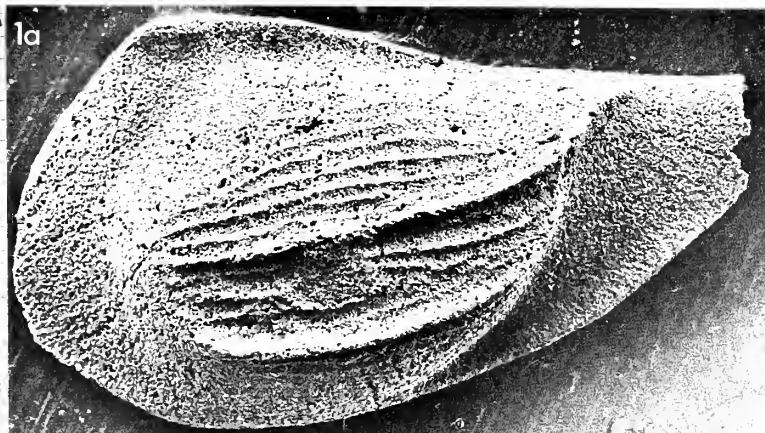
1985 - 1988 are from the Isle of Gotland (Baltic Sea); Öjlemyrflint erratic boulders nos. G6 (1985 - 1987; type locality; coll. by Horst Kaufmann, 1975) and G30 (1988; beach opposite the Isle of Lilla Karlsö; lat. 57° 18'N, long. 18° 8'E; coll. by the author, 1976). 1989 is from Hornstein boulder no. Sy74 of the Kaolinsand (Pliocene - ? Pleistocene), near Braderup, the Isle of Sylt (N Frisian Is); lat. 54° 56'N, long. 8° 21'E; coll. by Ulrich von Hacht, 1976. All specimens are of Upper Ordovician age.

Diagnosis: As for the genus.

Distribution: Öjlemyrflint erratic boulders of the Isle of Gotland (Baltic Sea) and special Hornstein boulders of the Kaolinsand (Pliocene - ? Pleistocene) of the Isle of Sylt (N. Frisian Is, N Sea). All Upper Ordovician age.

Explanation of Plate 5, 56

Fig. 1, LV, int. lat. (GPIH 1988, 560 μm long); fig. 2, LV, ext. lat. (GPIH 1989, 685 μm long).
Scale A (100 μm ; x 170), fig. 1; scale B (100 μm ; x 140), fig. 2.



ON *TETRADELLA EGOROWI* NECKAJA

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Tetradella egorowi Neckaja, 1952

- 1952 *Tetradella egorowi* sp. nov. A. I. Neckaja, *Trudy vses. nauchno-issled. geol. razv. Inst.* **60** (= *Mikrofauna SSSR* **5**), 217, 225 - 26 (presumably *pars*, see remarks), pl. 2, fig. 10.
1953. *Tetradella egorowi* Neckaja & *T. egorovi* Neckaja; A. I. Neckaja, *Ibid.* **78** (= *Stratigrafija i fauna ordovika i silura zapada Russkoj platformy*), 326 - 28, 329, 330, 360, 361, table 1 (358) (presumably *pars*, see remarks), pl. 3, figs. 1 - 6.
1954 *Tetradella plicatula* (Krause); G. Henningsmoen, *Norsk geol. Tidsskr.* **33** (1/2), 80, 81, 101 (*pars*), pl. 1, fig. 11; *non* 80, 81, 101 (*pars*), pl. 1, figs. 8 - 10 (= *T. pentaloculata* Schallreuter sp. nov. & *T. sp.*).
1959 *Tetradella egorovi* Neckaja; L. Sarv, *Eesti NSV Tead. Akad. Geol. Inst. uurimused* **4**, 153, 195, table 2 (189).
1960 *Tetradella egorovi* Neckaja; L. Sarv, *Ibid.* **5**, 242, table 1.
1960 *Tetradella egorovi* Neckaja; I. E. Zanina, A. I. Neckaja & E. N. Polenova, *Osnovy paleontologii* **8** (*Členistonogie trilobitoobraznye i rakoobraznye*), text-fig. 700.
1966 *Tetradella egorovi* Neckaja; L. Sarv, *Iskopaemye ostrakody* (*Fossil Ostracoda*, 1971), **21** (& **22** respectively), pl. 2 (23), figs. 11, 12.
1971 *Tetradella egorowi* Neckaja; A. L. Guber, *J. Paleont.* **45** (1), 14, 16, 21, text-fig. 6, pl. 3, figs. 5, 6.
1973 *Tetradella egorowi* Neckaja; M. J. Copeland, *Geol. Surv. Can. Pap.* **72 - 43**, 14, text-figs. 2a, b.
1975 *Tetradella egorowi* Neckaja; Schallreuter, *N. Jb. Geol. Paläont. Abh.* **150** (3), 289.

Holotype: VNIGRI, Leningrad, no. **21 - 157** (Neckaja 1952, 225). Given elsewhere as **26 - 151** (Neckaja 1953, 326; Sarv 1959, 153). A presumed juv. tectonomorphic RV.

Explanation of Plate 5, 58

Figs. 1 - 3, ♀ LV (GPIH 1990, 1030 µm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl.; fig. 3, ext. ant. obl.
Scale A (250 µm; x 74), figs. 1, 2; scale B (250 µm; x 66), fig. 3.

Type locality: Porchov Region, Pskov District, Russia; approx. lat. 57° 48'N, long. 29° 35'E. Rakvere Stage (E), Upper Ordovician.

Figured specimens: Geologisch - Paläontologisches Institut, University of Hamburg, nos. **1990** (♀ LV: Pl. 5, 58, figs. 1 - 3), **1991** (tectonomorphic RV: Pl. 5, 60, figs. 1 - 3). Both from the Isle of Gotland (Baltic Sea); Öjlemyrflint erratic boulders, nos. G13 (**1991**; beach at Häftings: lat. 57° 53'N, long. 18° 37'E; coll. by Horst Kaufmann, 1975) and G30 (**1990**; beach opposite the Isle of Lilla Karlsö; lat 57° 18'N, long 18° 8'E; coll. by the author, 1976). Both Upper Ordovician age.

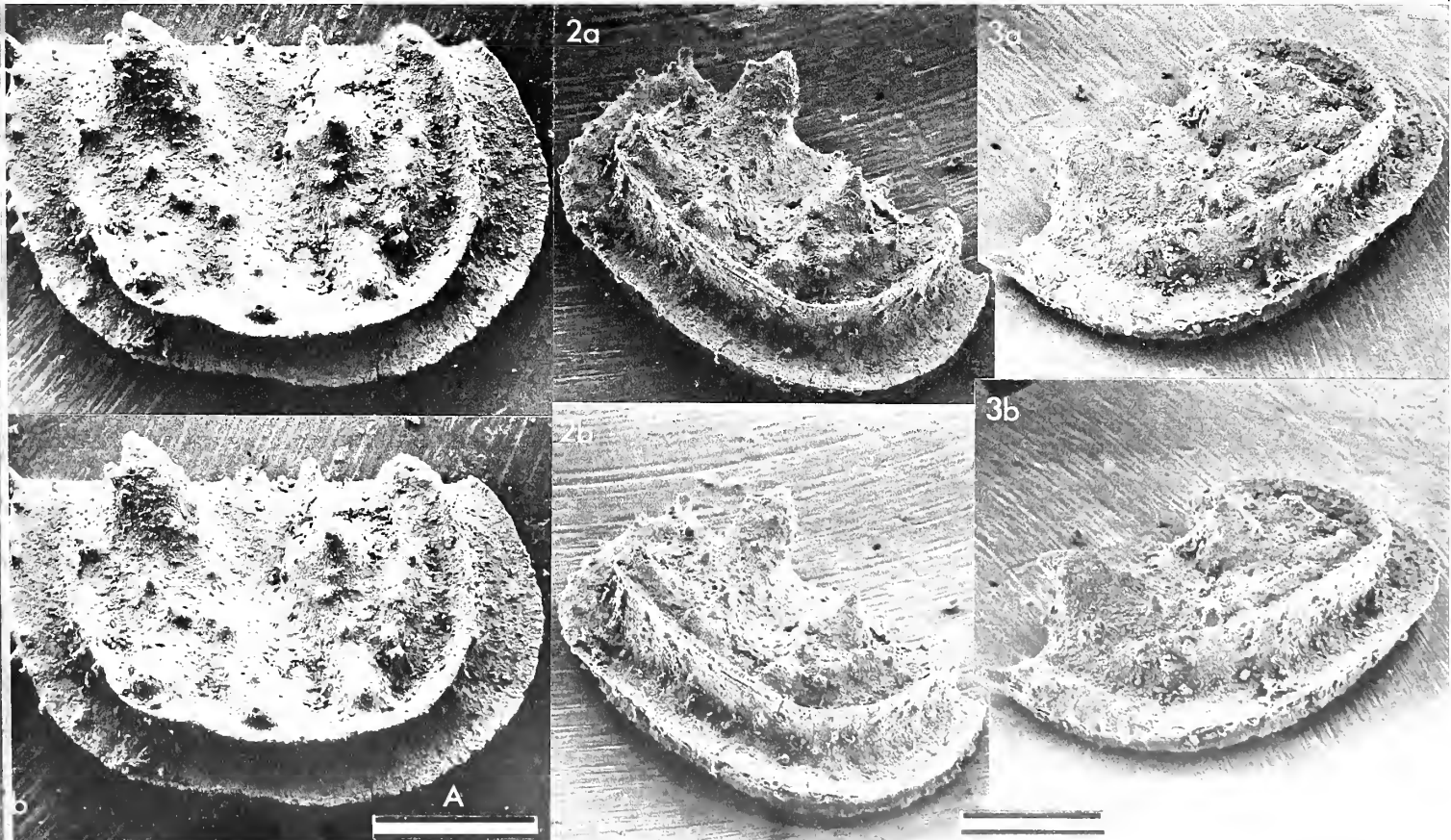
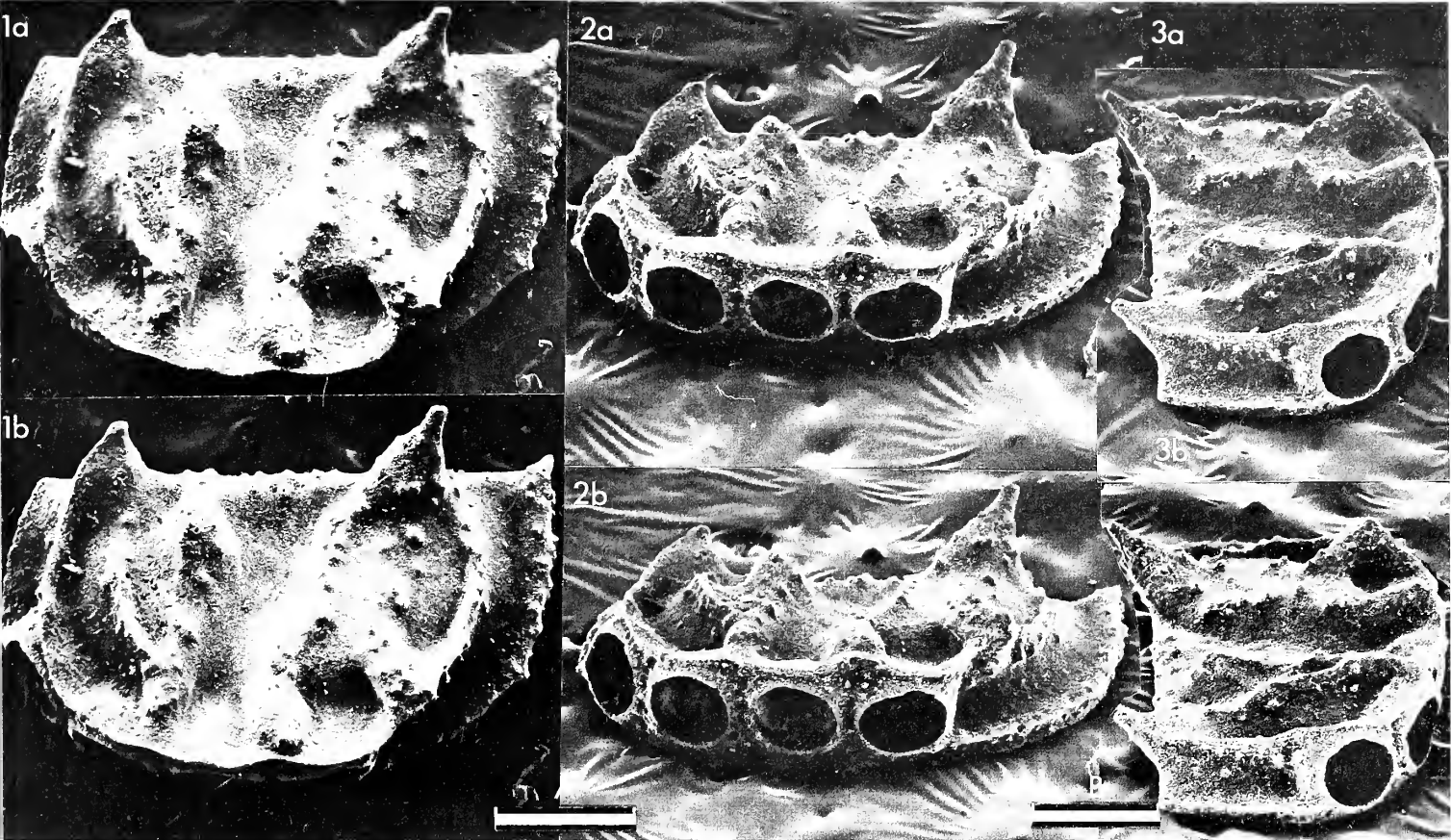
Diagnosis: Adult valves 0.90 - 1.03mm long. Unisulcate, S2 long, sigmoidal. Spine-like nodes outline remnants of quadrilobation: two at dorsal border, near anterior cardinal corner (L1) and mid-posteriorly (L3/4) respectively; three in ventral regions (L2 ventral, L3, L4); one at preadductor node (L2). L1 and ventral margins of ventral nodes are connected by a striated, flange-like histial ridge which can be extended to behind L3/4. Cristae connect dorsal margin of L2 ventral node with L1 and preadductor node respectively, and also occur between L3/4 nodes and L3, L4 respectively; cristae very often developed only as rows of tubercles. No plica. Four loculi in each female valve. Surface smooth or finely granulate/reticulogranulose; granules distributed irregularly or, along histium and velum, in parallel rows.

Remarks: Lobal morphology suggests that *T. egorowi* possibly originated from a species similar to *T. ellipsilira* Kay, 1940 or, *T. quadrilirata* (Hall & Whitfield, 1875) (cf. Guber, op. cit., text-fig. 6). It is unknown whether as in the two latter taxa, the adult male of *T. egorowi*, possess a buttress-like structure which joins the velum to the histium. For further remarks see *T. pentaloculata* sp. nov. (Schallreuter, *Stereo-Atlas of Ostracod Shells* **5** (10) 65 - 72, 1978).

Distribution: Upper Ordovician of Baltoscandia: Leningrad and Pskov districts: Rakvere Stage (E); Estonia; Rakvere Stage (E) - Põrgu Stage (F_{1c}); Lithuania; Lower Saaremyja Beds (= F_{1a}); Oslo Region: 5b horizon; Öjlemyrflint erratic boulders of the Isle of Gotland (Baltic Sea) and of the Kaolinsand (Plio-Pleistocene) of the Isle of Sylt (N Frisian Is, N Sea).

Explanation of Plate 5, 60

Figs. 1 - 3, juv. RV (GPIH 1991, 860 µm long): fig. 1, ext. lat.; fig. 2, ext. anterovent. obl.; fig. 3, ext. posterovent. obl.
Scale A (250 µm; x 87), fig. 1; scale B (250 µm; x 102), figs. 2, 3.



ON *TETRADELLA SEPARATA* SIDARAVIČIENE

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Tetradella separata Sidaravičienė, 1971

- 1971 *Tetradella separata* sp. nov. N. sidaravičienė, *Palaeontology and stratigraphy of the Baltic and the Byelorussia* 3, 27, 28, 32, 34, table 1 (pars), pl. 1, fig. 2. *non* 28, 32, 34, table 1 (pars), pl. 1, fig. 3 (= *T. ? trilocolata* Schallreuter sp. nov).
1975 *Tetradella separata* Sidaravičienė, Schallreuter, *N. Jb. Geol. Paläont. Abh.* 150 (3), 289.

Holotype: Institute of Geology, Vilnius, Lithuania, no. 13 - 31/1, ♀ RV.

Type locality: At 648.5m in a borehole at Lapes, NE of Kaunas (Kowno), Lithuania; approx. lat. 55° 13'N, long. 24° 12'E. Porkuni Stage (F₂), Upper Ordovician.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg, nos. 1992 (♀ LV: Pl. 5, 62, figs. 1 - 3), 1993 (juv. LV: Pl. 5, 64, figs. 1, 2), 1994 (juv. LV: Pl. 5, 64, fig. 3). From the Isle of Gotland (Baltic Sea), Öjlemyrflint erratic boulders nos. G13 (1993, 1994; beach at Häftings: lat. 57° 53'N, long. 18° 37'E; coll. by Horst Kaufmann, 1975) and G16 (1992; beach N of Lickershamn: lat. 57° 49.5'N, long. 18° 30.5'E; coll. by the author, 1976). All specimens are of Upper Ordovician age.

Explanation of Plate 5, 62

Figs. 1 - 3, ♀ LV (GPIH 1992, 1125 µm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl.; fig. 3, ext. ant. obl.
Scale A (250 µm; x 73), figs. 1, 2; scale B (250 µm; x 53), fig. 3.

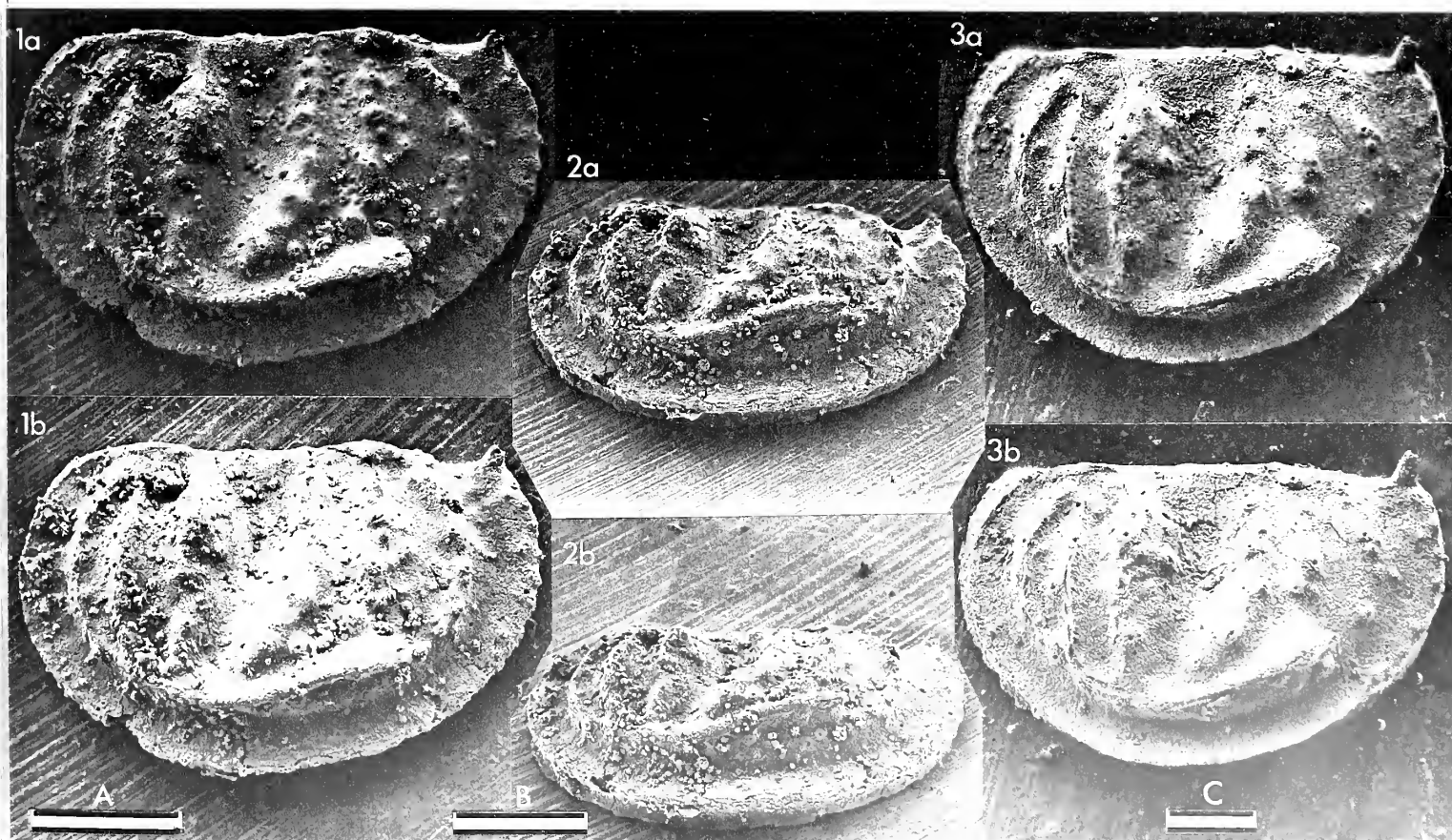
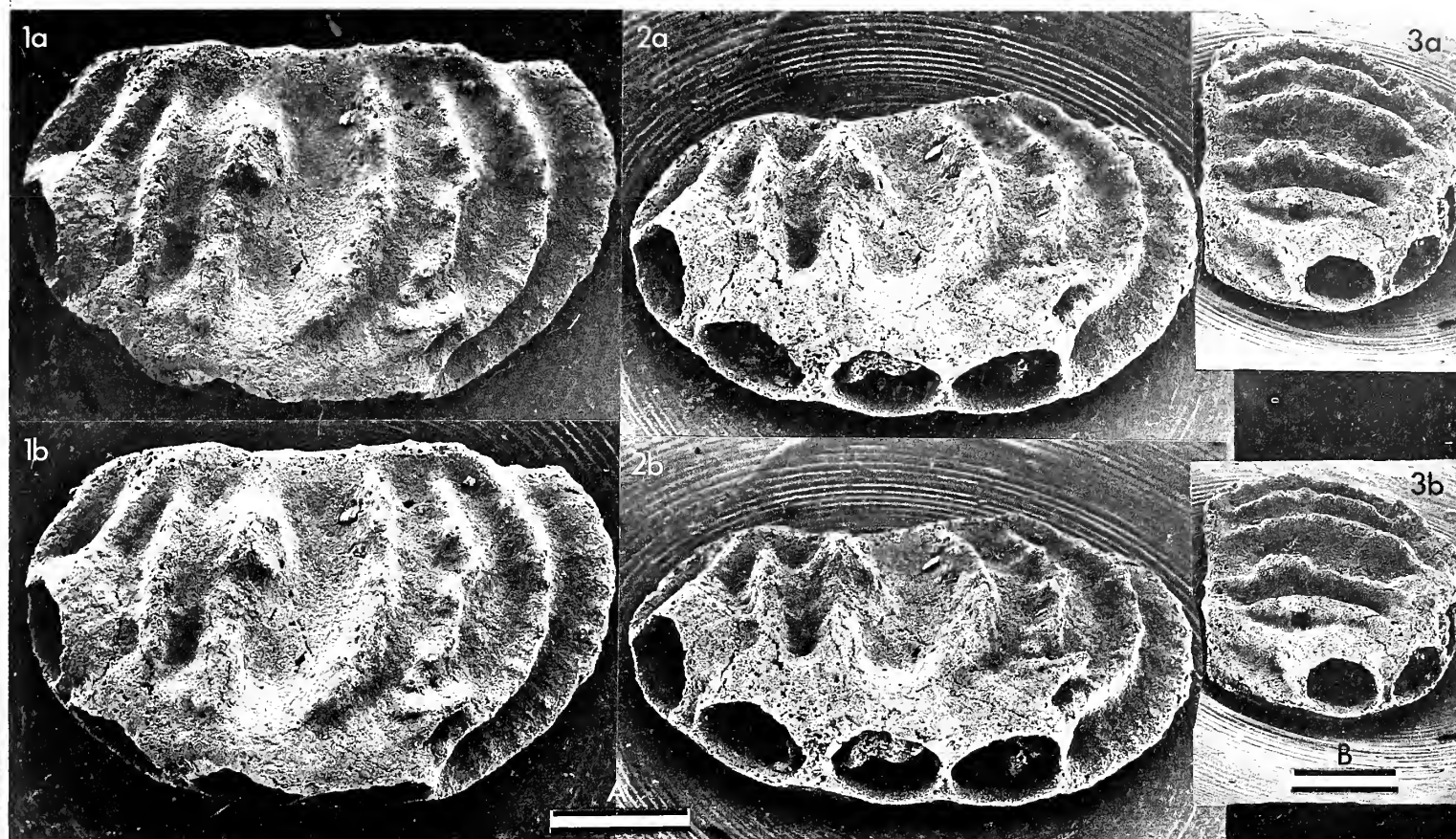
Diagnosis: Adult valves 1.00 - 1.13 mm long. Unisulcate; S2 long, only weakly sigmoidal. Preadductor node relatively small, elongate. Dorsal plica entire. Histial ridge parallels anterior and ventral part of lateral margin, ending posteriorly as a short, stout spine. Cristae present, often dissolved into rows of tubercles; occur between and, in part, as a continuation of histium and dorsal plisa. Two cristae in front of S2, three behind. Anterior cristae perpendicular to dorsal margin, straight or only weakly convex in anterior direction, not uniting ventrally before reaching histium; posterior cristae also isolated, bow-shaped and approximately parallel to posterior margin. Four loculi in each female valve. Histium undeveloped adjacent to loculi, except for spine-like ending directly above fourth loculus at ventral end of middle posterior crista. Surface smooth.

Remarks: Adult males are unknown. Therefore, it is not known whether or not this species possesses a buttress-like structure joining velum and histium. In lobation and cristation *T. separata* is similar to *T. ulrichi* Kay (*J. Paleont.* 8 (3) 1934), a species which also is not known to have a buttress (cf. Guber, *J. Paleont.* 45 (1), 21, 1971). For further remarks see *T. ? trilocolata* sp. nov. (Schallreuter, *Stereo-Atlas of Ostracod Shells* 5 (11) 73 - 80, 1978).

Distribution: Originally documented from the Porkuni Stage (F₂) of Lithuania (Sidaravičienė, op. cit., 27, 28). Other records in the same paper (34 and table 1), from F₁ c horizons, may have been given in error. Öjlemyrflint erratic boulders of the Isle of Gotland (Baltic Sea) and of the Kaolinsand (Plio-Pleistocene) of the Isle of Sylt (N Sea); Upper Ordovician.

Explanation of Plate 5, 64

Figs. 1, 2, juv. LV (GPIH 1993, 900 µm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl. Fig. 3, juv. LV, ext. lat. (GPIH 1994, 590 µm long).
Scale A (250 µm; x 80), fig. 1; scale B (250 µm; x 67), fig. 2; scale C (100 µm; x 114), fig. 3.



ON *TETRADELLA PENTALOCULATA* SCHALLREUTER sp. nov.

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Tetradella pentaloculata sp. nov.

- 1954 *Tetradella plicatula* (Krause); G. Henningsmoen, *Norsk geol. Tidsskr.* 33 (1/2), 80, 81, 101 (*pars*), text-fig. 3, pl. 1, figs. 8, 9; *non* 80, 81, 101 (*pars*), pl. 1, figs. 10, 11 (= *T. sp.* & *T. egorowi*).
- 1962 *Tetradella plicatula* (Krause); L. Sarv, *Eesti NSV Tead. Akad. Geol. Inst. uurimused* 9, 95, 115, 117 (*pars*), 97, 116, table 1, pl. 5, figs. 11 - 13; *non* 95, 115, 117 (*pars*) (= *T. egorowi*, *T. sp.* & *T. ? plicatula*).
- 1967 *Tetradella plicatula*; R. E. L. Schallreuter, *Neus Jb. Geol. Paläont. Mh.* 1967 (7), 434.
- 1975 *Tetradella ? plicatula*; Schallreuter, *Ibid. Abh.* 150 (3), 289.

Holotype: Geologisch-Paläontologisches Institut, University of Hamburg, no. 2000, ♀ LV.

Type locality: Beach at Visby, Isle of Gotland (Baltic Sea); lat. 57° 40'N, long. 18° 18.5'E. Öjlemyrflint erratic boulder (no. 789); Upper Ordovician.

Explanation of Plate 5, 66

Figs. 1 - 3, incomplete ♀ LV (holotype, GPIH 2000, 1020 µm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl.; fig. 3, ext. ant. obl.
Scale A (250 µm; x 75), figs. 1, 2; scale B (250 µm; x 53), fig. 3.

Derivation of name: Referring to the five loculi of the female valve.

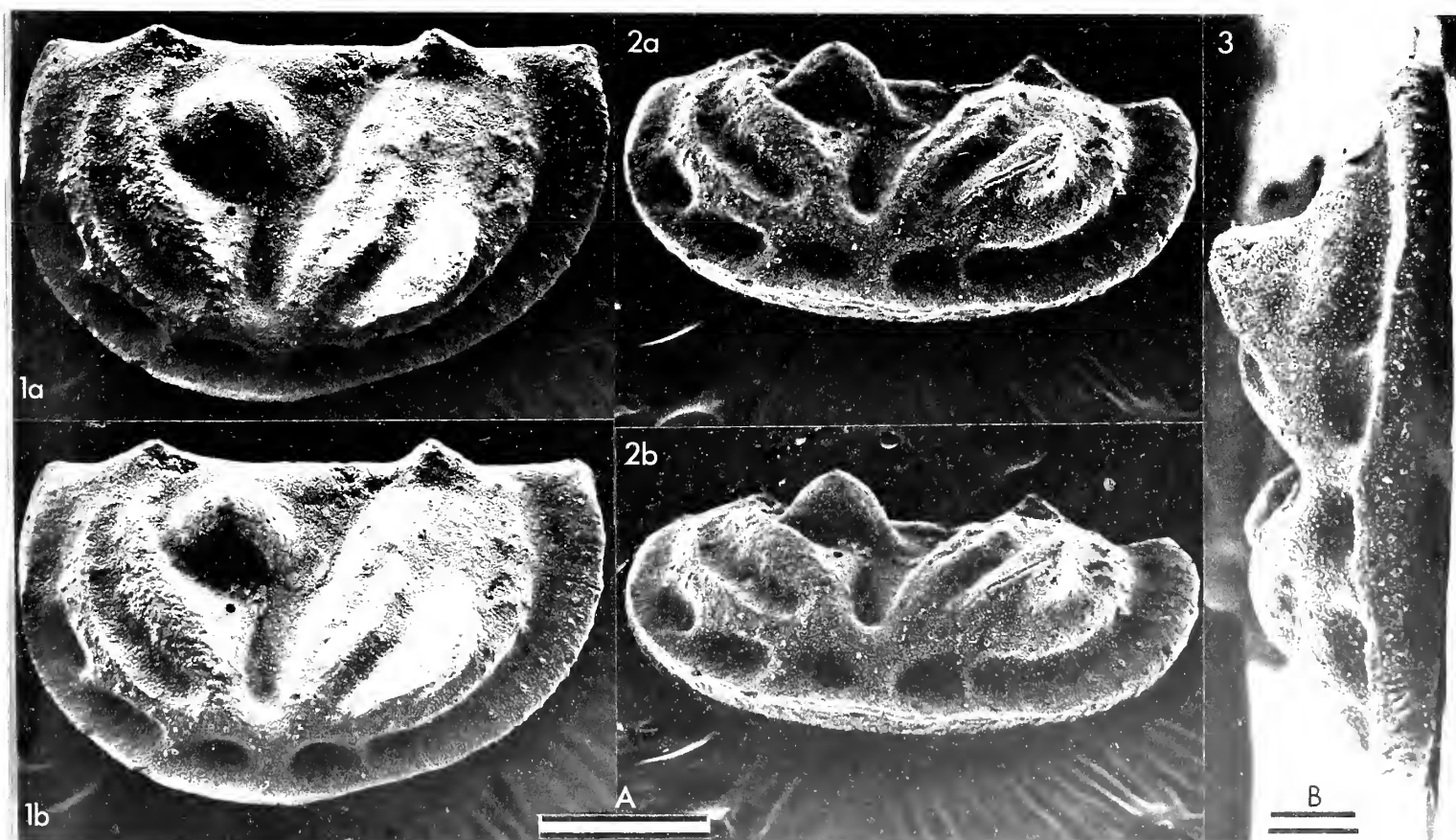
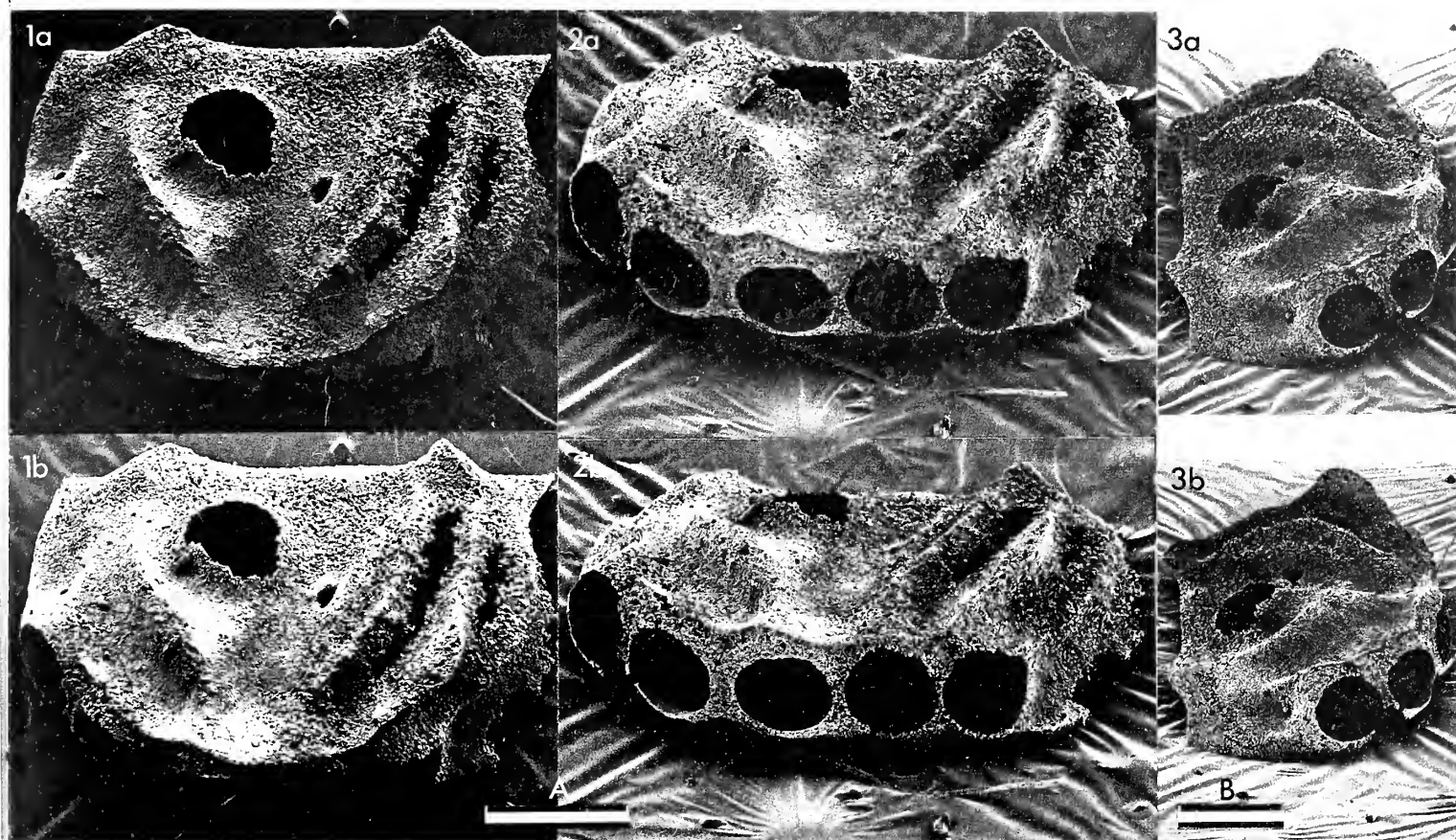
Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg, nos. 2000 (♀ LV: Pl. 5, 66, figs. 1 - 3), 2001 (juv. ♀ LV: Pl. 5, 68, figs. 1 - 3), 2002 (juv. ♂ RV: Pl. 5, 70, figs. 1, 2), 2003 (juv. LV: Pl. 5, 70, fig. 3), 2004 (♂ RV: Pl. 5, 72, figs. 1 - 3). From the Isle of Gotland (Baltic Sea), Öjlemyrflint erratic boulders nos. 789 (2000, 2003, 2004; for further data see type locality) and G30 (2001, 2002; beach opposite the Isle of Lilla Karlsö; lat. 57° 18'N, long. 18° 8'E; coll. by the author, 1976). All specimens are of Upper Ordovician age.

Diagnosis: Adults c. 1.10 - 1.15mm long. Essentially unisulcate; in adults S2 weakly sigmoidal, strongly inclined. Preadductorial node (L2) large, bulbous; S1 weak. Two oblique cristae, forming Y - shape, occur anteriorly and ventrally of (and on ?) the preadductorial node. L3/4 has three, nearly parallel cristae, uniting near dorsal plica; middle crista forms ventral, wing-like extension of histium; anterior crista occurs just behind S2 posterior border. Dorsal plica represented by two, short, cusp-like cristae; anterior cusp somewhat longer. Male has buttress below S2; each female valve has five loculi. Surface tuberculate, irregularly granulose; tubercles commonly occur instead of cristae in juveniles, granules present even in S2, except centrally, behind preadductorial node.

Remarks: This new species is characterized by the occurrence of five loculi in each female valve. Guber confined the genus *Tetradella* Ulrich, 1890 to tetraloculate forms (*J. Paleont.* 45 (1), 14, 1971).

Explanation of Plate 5, 68

Figs. 1 - 3, juv. ♀ LV (GPIH 2001, 890 µm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl.; fig. 3, ext. vent.
Scale A (250 µm; x 90), figs. 1, 2; scale B (100 µm; x 114), fig. 3.



Remarks: The differentiation of supraspecific taxa based on the number of loculi is, however, not considered possible in this particular case, because *T. pentaloculata* seems to originate from tetralocular forms; the fifth loculus in the preadult female is not separated, by a septum, from the posterior canaliculus (Pl. 5, 68, figs. 2, 3). Furthermore, the number of loculi also varies within other loculate genera (e.g. *Tetrasacculus* Stewart, 1936, *Semibolbina* Jordan, 1964; see Schallreuter, *Paläont. Z.* **51** (1/2), 39, 43, 1977).

Since Henningsmoen's paper (op. cit.), this species has been identified with *Tetradella plicatula*. The holotype of that species differs fundamentally from the new species by its elongate, drop-like preadductorial node, the morphology of its cristae (\pm parallel to each other; not Y-like anteriorly; not uniting at the posterior, dorsal plica) and its lack of plical cusps (Krause, *Z. dt. geol. Ges.* **44** (3), pl. 22, fig. 13, 1892).

Neckaja mentioned the occurrence of up to five loculi in each female valve of her new species *T. egorowi* (*Trudy rses neft. nauchno-issled. geol. razv. Inst. n. ser.* **60** = *Mikrofauna SSSR* **5**, 225, 1952; *Ibid.* **78**, 327, 1953). Apparently, she mixed at least two different species under *T. egorowi*, which is considered to be tetraloculate (Schallreuter, *Stereio-Atlas of Ostracod Shells* **5** (8) 57 - 60, 1978). The pentaloculate forms she mentions represent, therefore, either a new species or *T. pentaloculata*, which, in the latter case, would extend its occurrence into at least the lower F₁ stage of the Baltic.

A buttress, linking velum and histium in the male, occurs in *T. pentaloculata* and the tetralocular species *T. quadrilirata* (Hall & Whitfield, 1875) (type-species), *T. ellipsilira* Kay, 1940, *T. thomasi* Copeland, 1973 and *T. simplex* (Ulrich, 1889) (cf. Guber, op. cit., and Copeland, *Geol. Surv. Can. Pap.* **72** - **43**, 13, 1973); another common feature is the discontinuous, \pm cusp-like plica. Perhaps these species represent a distinct sub-genus. Because it lacks a buttress, *T. scotti* would therefore be considered outside both this group and the temporal-morphologic series of those *Tetradella* species, outlined by Guber (op. cit., 15, text-fig. 6).

Explanation of Plate 5, 70

Figs. 1, 2, juv. ♂ RV (GPIH 2002, 990 μ m long): fig. 1, ext. lat.; fig. 2, ext. vent. obl. Fig. 3, juv. LV, ext. lat. (GPIH 2003, 610 μ m long).

Scale A (250 μ m; x 80), figs. 1, 2; scale B (100 μ m; x 82), fig. 3.

Remarks: A revised phylogeny would show *T. quadrilirata* followed by *T. thomasi* (cf. Copeland, loc. cit.) and possibly, as another branch, by *T. pentaloculata*. The dimensions of these species are in accordance with these suggestions (younger species larger).

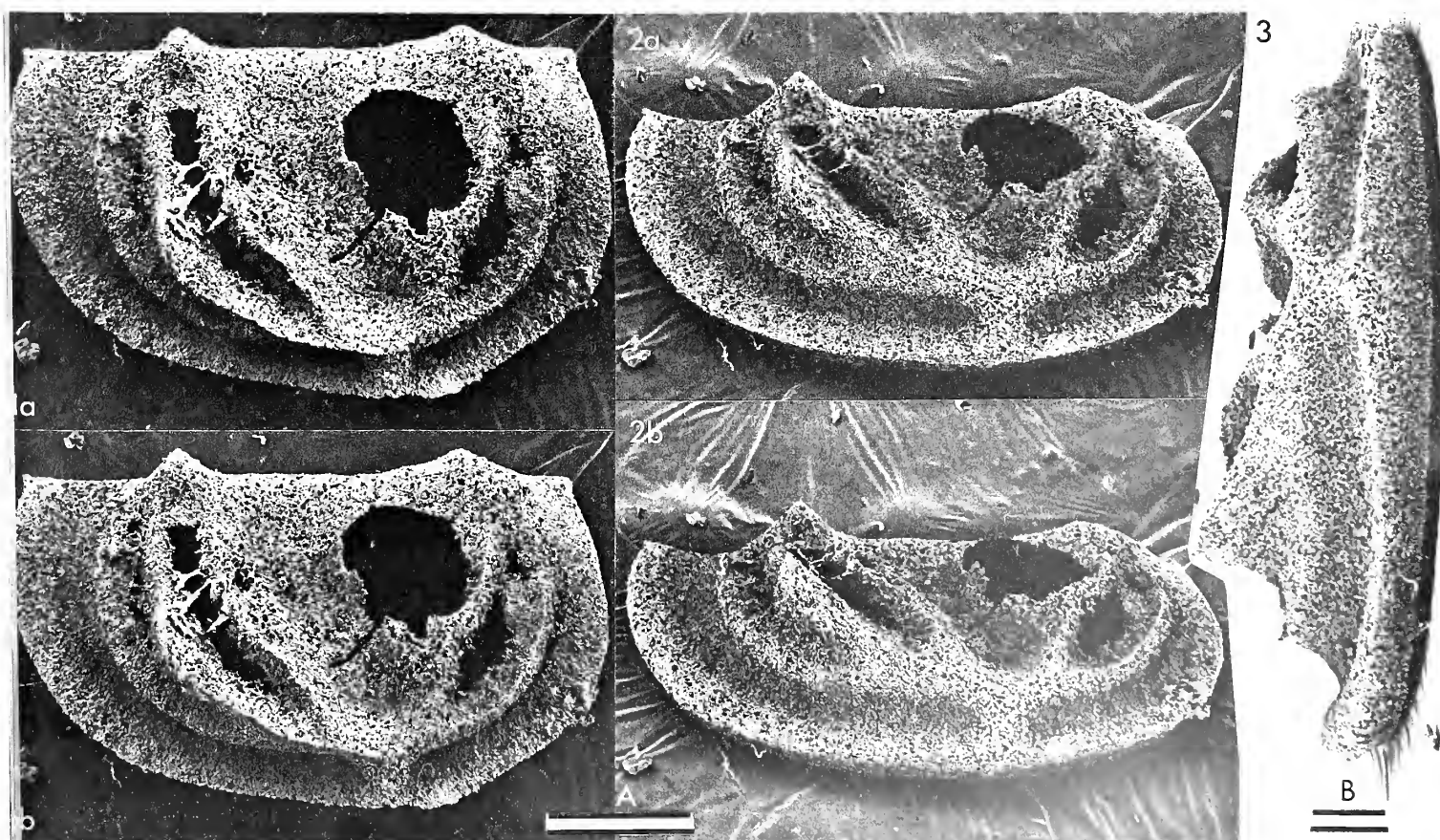
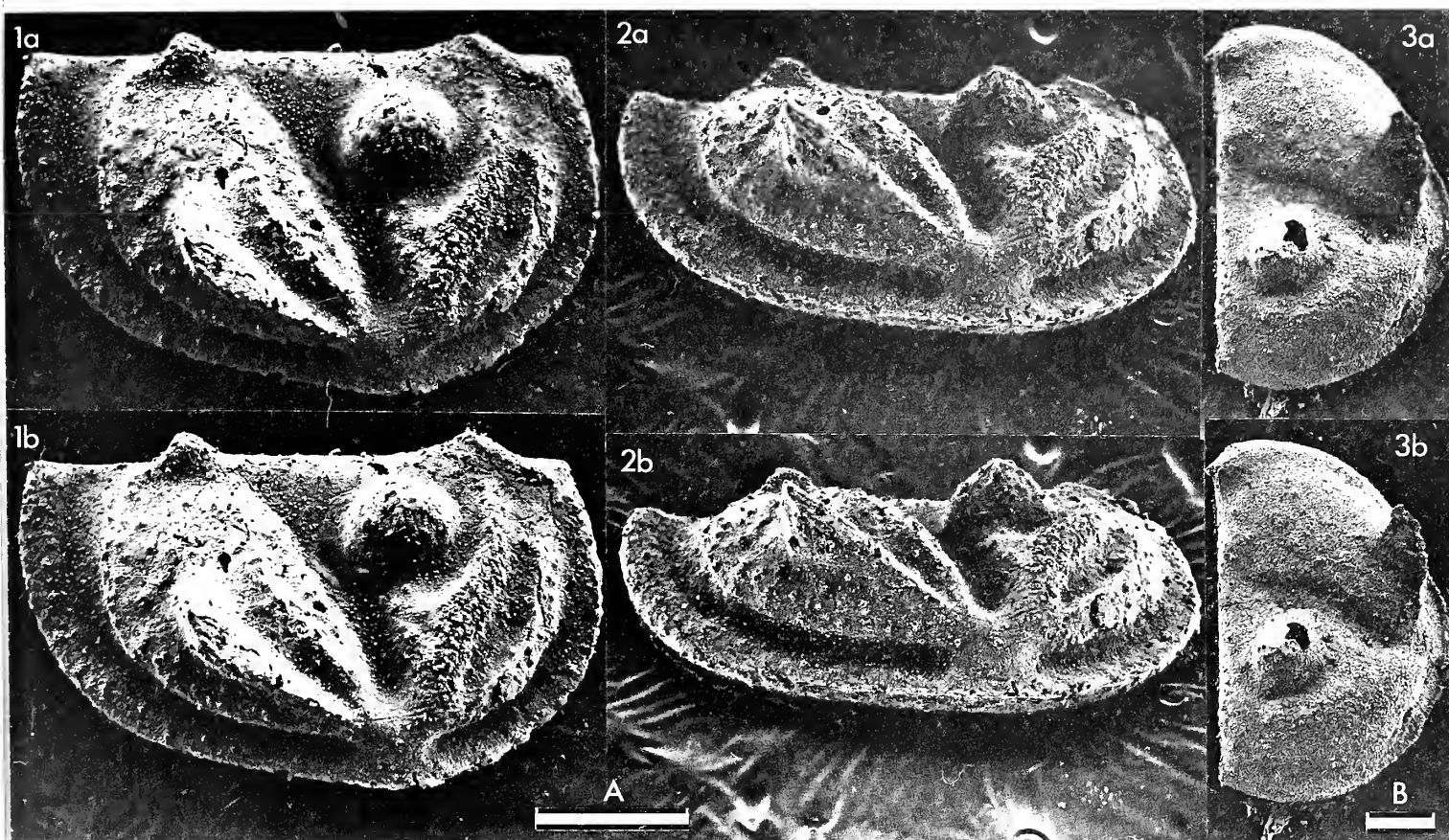
Guber (op. cit.) maintained that histial dimorphism occurs in *Tetradella*, an opinion disputed by Schallreuter (1967) on the basis of, *inter alia*, the published material of *T. pentaloculata* (see also Pl. 5, 66, Pl. 5, 72). This material demonstrates that the histium is not dimorphic: the distance between the first crista and the edge of the histium is about the same in the male and female valves. Moreover, in *T. egorowi* the distance between the edge of the histium and the crests of the ventral spines is about the same in both dimorphs (Schallreuter, *Stereio-Atlas of Ostracod Shells*, Pl. 5, 58, fig. 1, Pl. 5, 60, fig. 1, 1978). [In contrast, the velar flange seems to be broader in the male in both species]. Similarly, *T. ? triloculata* lacks histial dimorphism: in both dimorphs the histial ridge does not extend below a ventral line projected from the end of the fourth crista and, anteriorly, extends only slightly beyond a vertical line drawn through the anterior cardinal corner (Schallreuter, *Stereio-Atlas of Ostracod Shells*, Pl. 5, 74, fig. 1, Pl. 5, 76, fig. 1, 1978). Guber's method to prove the occurrence of histial dimorphism was by measuring the distance from dorsal margin to histial edge. What he actually measured, however, was the extent of domiciliar dimorphism (Schallreuter, *Palaeontographica* **153** (4/6), 167, 1976), a type of dimorphism also apparently present in *T. pentaloculata* (adult male more slender than adult female). *T. ? carinata* Keenan (*J. Paleo.* **25** (5), pl. 79, figs. 29 - 30, 1951) is superficially very similar to the new species although the figures are too poor to be certain.

Distribution: Estonia: Porkuni stage (F₂), Oslo Region, Norway: 5a(- b) horizon. Öjlemyrflint erratic boulders of the Isle of Gotland (Baltic Sea) and of the Kaolinsand (Plio-Pleistocene) of the Isle of Sylt (N Sea).

Explanation of Plate 5, 72

Figs. 1 - 3, ♂ RV (GPIH 2004, 1070 μ m long): fig. 1, ext. lat.; fig. 2, ext. vent. obl.; fig. 3, ext. vent.

Scale A (250 μ m; x 77), figs. 1, 2; scale B (100 μ m; x 95), fig. 3.



ON *TETRADELLA? TRILOCULATA* SCHALLREUTER sp. nov.

by Roger E. L. Schallreuter
(University of Hamburg, German Federal Republic)

Tetradella ? triloculata sp. nov.

1971 *Tetradella separata* sp. nov. N. Sidaravičienė, *Palaeontology and stratigraphy of the Baltic and the Byelorussia* 3, 28, 32, 34, table 1 (*pars*), pl. 1, figs. 3a - b.

Holotype: Geologisch-Paläontologisches Institut, University of Hamburg, no. 1995, ♀ RV.

Type locality: Beach at Gnisvårds, Isle of Gotland (Baltic Sea); lat. 57° 30'N, long. 18° 7'E. Öjlemyrflint erratic boulder (no. G8); Upper Ordovician.

Derivation of name: With reference to the three loculi of the female valve.

Figured specimens: Geologisch-Paläontologisches Institut, University of Hamburg, nos. 1995 (♀ RV: Pl. 5, 74, figs. 1 - 3), 1996 (♂ RV: Pl. 5, 76, figs. 1 - 3), 1997 (juv. ♀ RV: Pl. 5, 78, figs. 1 - 3), 1998 (juv. (?) ♂ RV: Pl. 5, 80, figs. 1 - 2), 1999 (juv. LV: Pl. 5, 80, fig. 3). From the Isle of Gotland (Baltic Sea); Öjlemyrflint erratic boulders nos. G8 (1995, 1996, 1998, 1999; from type locality) and 791 (1977; beach at Lummelunds bruk, lat. 57° 44.5'N, long. 18° 24.5'E). Upper Ordovician.

Explanation of Plate 5, 74

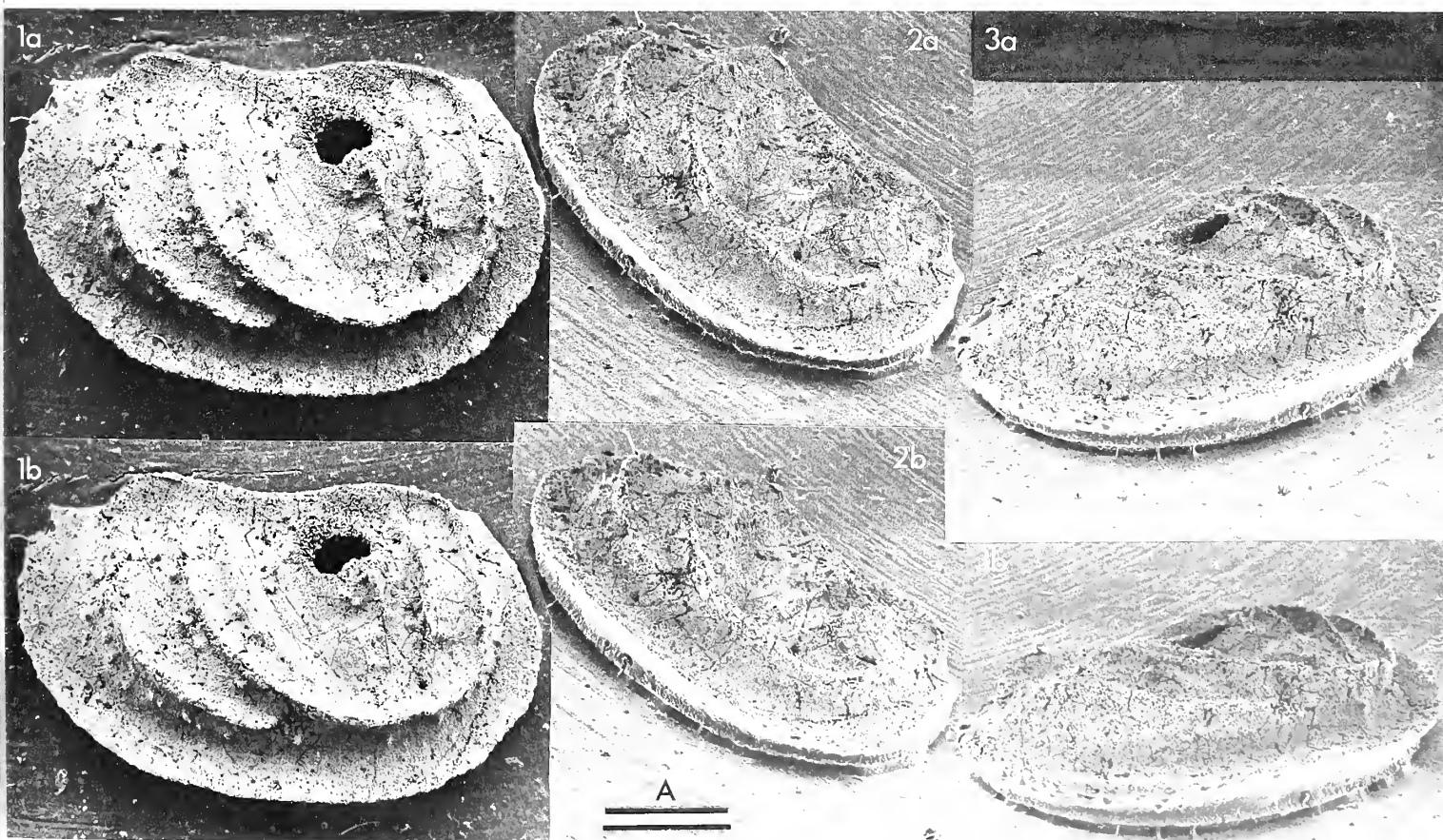
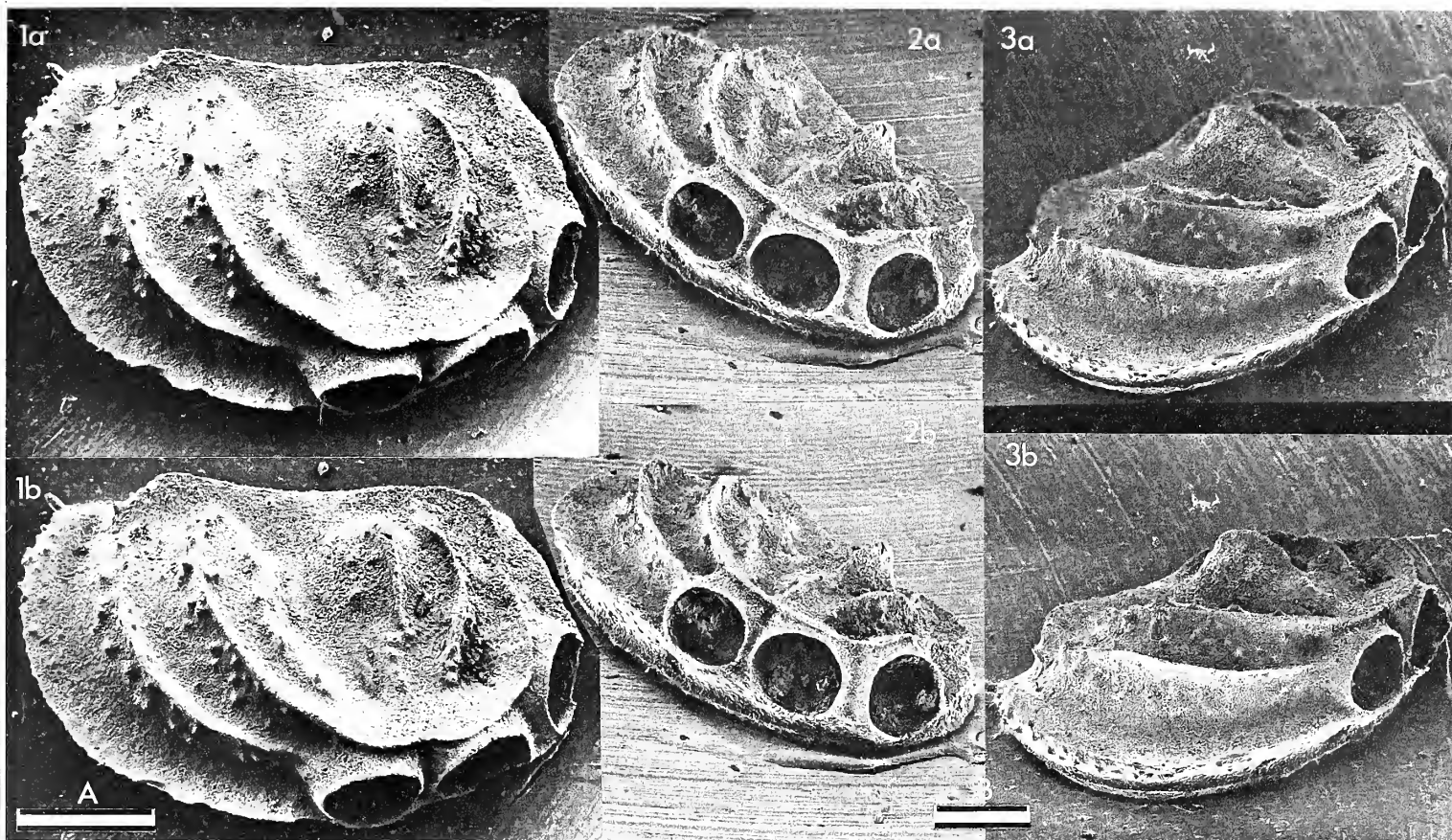
Figs. 1 - 3, ♀ RV (holotype, GPIH 1995, 1050 µm long): fig. 1, ext. lat.; fig. 2, ext. anterovent. obl.; fig. 3, ext. posterovent. obl. Scale A (250 µm; x 73, fig. 1; scale B (250 µm; x 65), figs. 2, 3.

Diagnosis: Adults c. 1.05 - 1.11 mm long. Unisulcate; S2 long, sigmoidal. Preadductorial node rounded, crossed by a short, slightly inclined crista which is dissolved ventrally into a row of tubercles. Anteriorly there is an isolated, anteriorly convex crista, behind a histial ridge which is confluent with an entire, dorsal plica and which continues ventrally, around the base of S2, to join the middle crista of the postadductorial area. Three posterior cristae sub-parallel to posterior valve margin; anterior-most of these three (lying at border of S2), and dorsal parts of other two posterior cristae, developed only as a row of tubercles. All three posterior cristae become obsolete beneath dorsal plica. Posterior-most crista isolated. Female with three loculi; velar ridge present between the loculi as 'connecting locular crests'. Histial ridge also present in the female, but is non-dimorphic. Male without a buttress. Surface with scattered tubercles and partly very faint reticulation.

Remarks: A tecomorphic valve of this species was figured by Sidaravičienė (op. cit.), when describing the tetraloculate species *T. separata*. *T. ? triloculata* differs from *T. separata* by lacking a posteroventral spine and by having only three loculi, a more bulbous preadductorial node, an isolated posterior crista and a histium which, together with the confluent middle posterior crista, forms a wide, characteristic arc-like structure even in the female. Also triloculate are *T. ? pulchra* Neckaja (*Trudy vses. nauchno-issled. geol. razr. Inst., n. ser.* 60 = *Mikrofauna SSSR* 5, 1952) and the closely similar *T. ? anticostiensis* Copeland (*Geol. Surv. Can. Pap.* 72 - 43, 1973), which may be synonymous. These two species are smaller (0.75 mm) than *T. ? triloculata* and possess no bifurcate L3. *T. ? anticostiensis* is described as being tri- or quadrilobate and, as in the new species and other *Tetradella* species, seems to be unisulcate; only the cristae suggest a former quadrilobate pattern.

Explanation of Plate 5, 76

Figs. 1 - 3 ♂ RV (GPIH 1996, 1070 µm long): fig. 1, ext. lat.; fig. 2, ext. anterovent. obl.; fig. 3, ext. posterovent. obl. Scale A (250 µm; x 67), figs. 1 - 3.



Remarks: *T. ? plicatula* (Krause) is very similar to the new species (*Z. dt. geol. Ges.* **44** (3) 1892). Like *T. ? triloculata*, the L3/4 complex has three cristae (of which the middle one is also the strongest), the anterior postadductorial crista lies at the border of S2 (in contrast to conditions in *T. pentaloculata* Schallreuter sp. nov.), the posterior crista is separated from the other cristae, and in front of the preadductorial node there are also two ridges. In contrast to the new species, the posterior crista of the two anterior ridges forms, according to the figure of the holotype (Krause, op. cit., pl. 22, fig. 13) a prolongation of the main crista; furthermore, the holotype lacks a plica and the preadductorial node seems to be more drop-like rather than rounded or bulbous.

The generic position of the triloculate species referred to *Tetradella* is uncertain (cf. Copeland, op. cit., 14). Guber restricted the genus to tetraloculate species (*J. Paleont.* **45** (1), 14, 1971), but Schallreuter maintains that the genus also contains species with five loculi (*T. pentaloculata* Schallreuter, *Stereo-Atlas of Ostracod Shells* **5** (10) 65 - 72, 1978). Whether triloculate species are also congeneric is difficult to decide at present. Guber (op. cit., 10) described rare, so-called triloculate 'mutants' within the adults of the normally tetraloculate *T. scotti* Guber. They may indeed be genuine mutations but, equally, it is also possible that these 'mutants' are atavistic forms, demonstrating that the ancestors of the tetraloculate *Tetradella* species were triloculate.

The known triloculate species are all unisulcate and it cannot, therefore, be assumed that they are very similar to the ancestors of *Tetradella*, which were presumably more strongly quadrilobate than the most distinctly quadrilobate *Tetradella* species (*T. perplexa* Copeland, *Bull. geol. Surv. Can.* **244**, 1974). The triloculate species could possibly belong to a triloculate genus which contains, like *Tetradella*, older quadrilobate members. This is, however, hypothetical and, therefore, the triloculate species must at present be considered to be derived from *Tetradella* and be placed within that genus.

The phylogenetic origin of the loculi in *Tetradella* is at present unknown but, by comparison with other loculate ostracods, there appear to be two possibilities:

1. The loculi originated more or less simultaneously, as in the Tetrasacculinae (Schallreuter, *Paläont. Z.* **51** (1/2), 1977). *Tetradella* would, in this case, originate from a quadrilobate dolonate ancestor (*Ogmoopsis* ?). Subsequent phylogeny introduced forms with an additional (*T. pentaloculata* sp. nov.) or reduced number of loculi (e.g. *T. ? triloculata*).

Explanation of Plate 5, 78

Figs. 1 - 3, juv. ♀ RV (GPIH 1997, 920 µm long): fig. 1, ext. lat.; fig. 2, ext. anterovent. obl.; fig. 3, ext. posterovent. obl.
Scale A (250 µm; x 79), figs. 1 - 3.

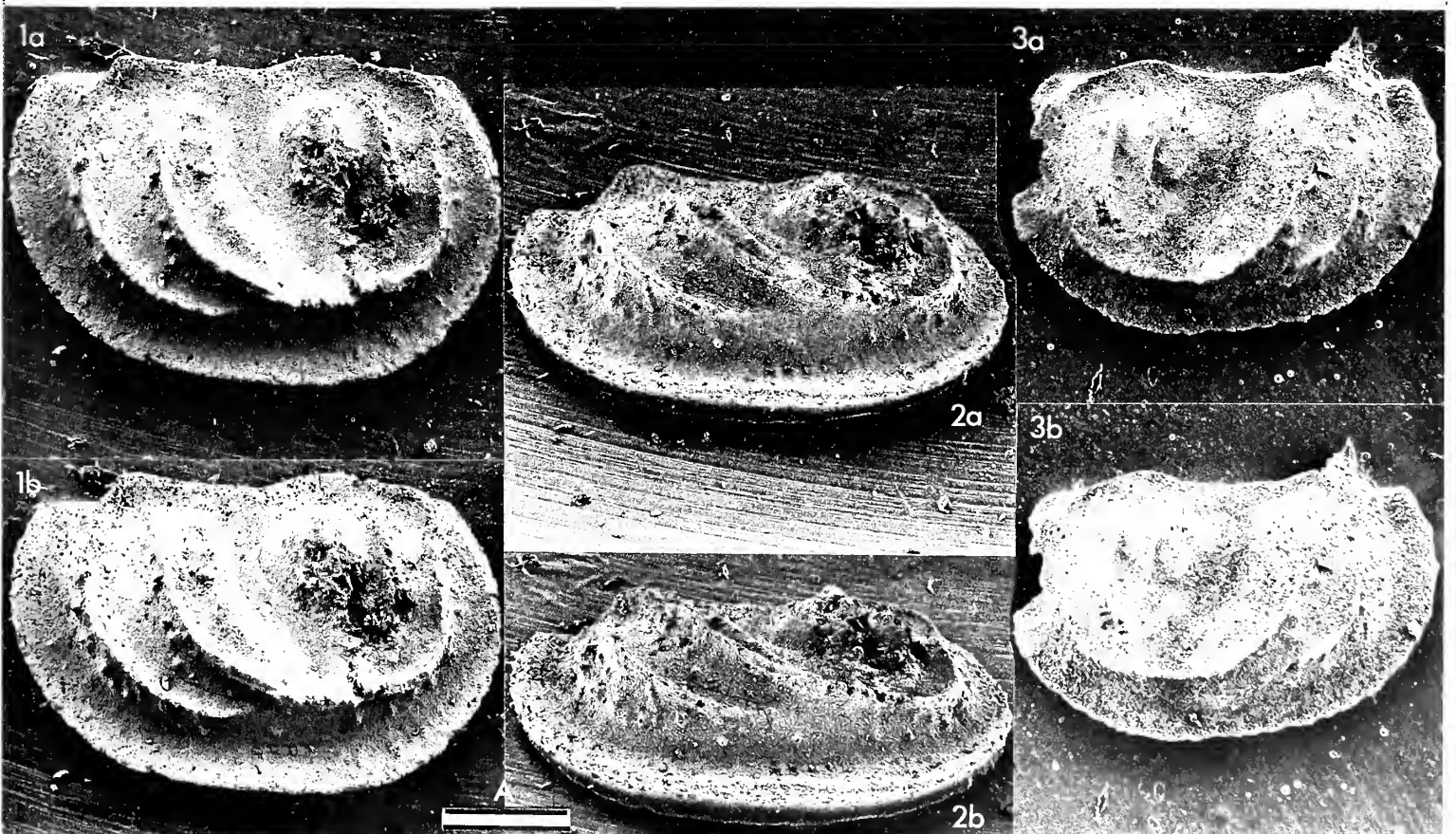
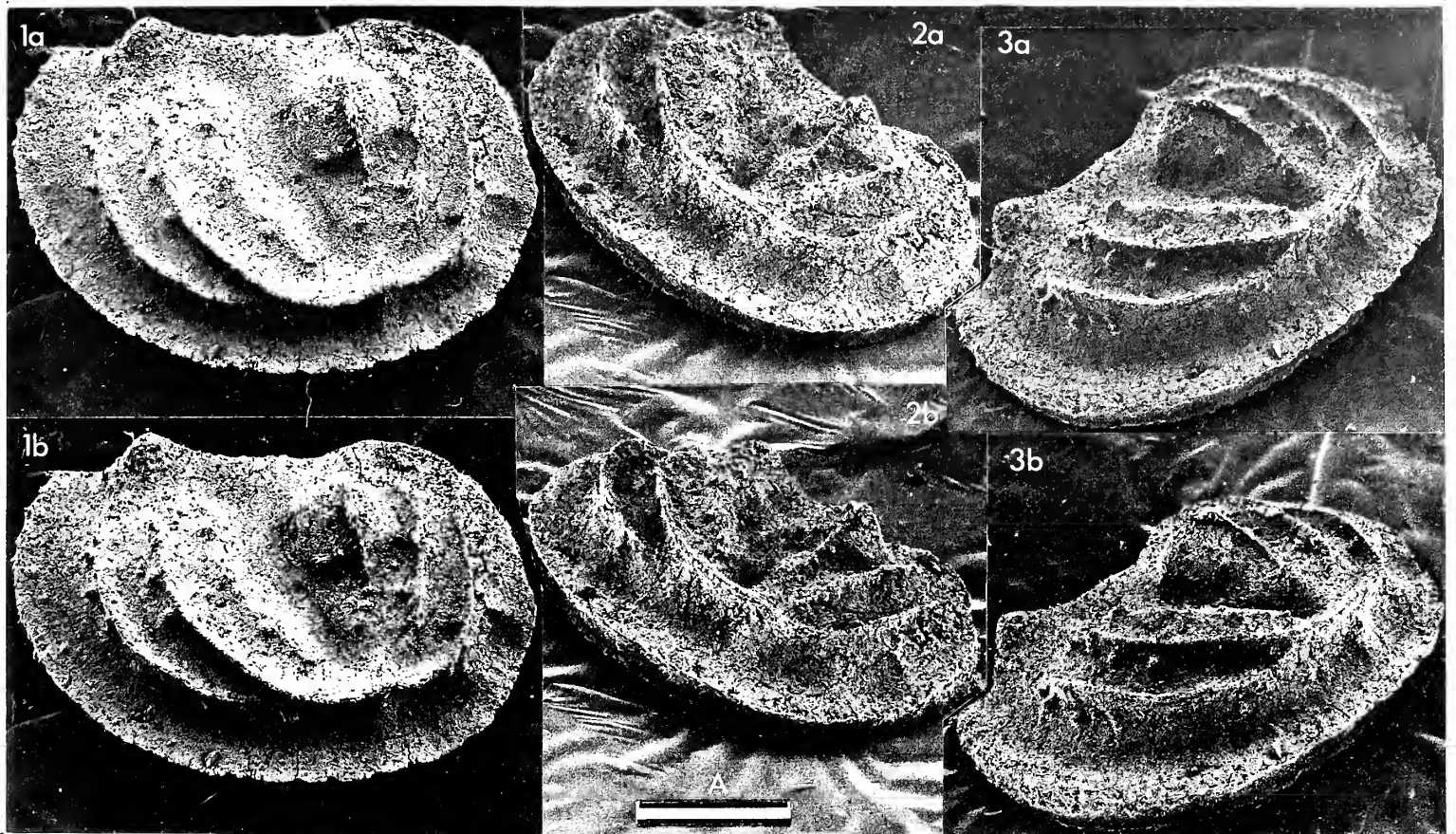
Remarks: 2. The loculi originated one after another, as in the Perspicillinae (Schallreuter, *Geologie* **15** (7) 1966, *Neus. Jb. Geol. Paläont. Mh.* 1967 (7)). *Tetradella* would, in this case, originate from a quadrilobate ancestor with less than four loculi. The unisulcate triloculate species which show, in the arrangement of the cristae, the former quadrilobate pattern, may also be derived from this ancestor.

The Middle Ordovician *Pleurodella* Copeland (*Bull. geol. Surv. Can.* **127**, 1965), which seems to be closely related to *Tetradella*, suggests the second alternative: *Pleurodella* has only one 'normal' circular locus, sited anteriorly. The ventral loculi are, according to Copeland (op. cit., 24), rectangular in outline, with the long axis antero-posteriorly. The number of loculi was not given by Copeland but, according to the figures op. cit., pl. 8, figs. 34, 35, pl. 10, fig. 8), there is only one rectangular locus in each valve; it is bordered anteriorly by the circular locus and posteriorly by a transverse ridge marking the boundary with an antral channel. Triloculate forms could originate by partition of the rectangular locus. Further loculi could be derived from a division of the post-locular, antral channel (e.g. *T. pentaloculata* Schallreuter, op. cit., 1978). The posterior transverse ridge of *Pleurodella* is reminiscent of the buttress in the males of certain *Tetradella* species (Schallreuter, op. cit., 1978). Guber (op. cit., 9) has previously noted that: "Perhaps the one buttress-technomorph is suggestive of the preloculate ancestors of *Tetradella*" (or, as indicated by *Pleurodella*, of uniloculate ancestors). However, as *Pleurodella* is unisulcate, it should not be considered an ancestor of *Tetradella* and only suggests a form of possible derivation of the loculi; both genera may originate from the same quadrilobate ancestor. The males of both *Pleurodella* and *T. ? triloculata* have no buttress. *T. ? triloculata* is, therefore, possibly more closely related to *Pleurodella* than to the typical *Tetradella* species; there are, however, other *Tetradella* species which lack a buttress (e.g. *T. scotti* = possibly a new subgenus), and a closer relationship to these forms is also possible.

Distribution: Porkuni Stage (F₂) of Lithuania (Sidaravičiene, op. cit., 27, 28; according to p. 34 and table 1 [= error?], F₁c). Öjlemyrflint erratic boulders of the Isle of Gotland (Baltic Sea); Upper Ordovician.

Explanation of Plate 5, 80

Figs. 1, 2, juv. (?) ♂ RV (GPIH 1998, 1010 µm long): fig. 1, ext. lat.; fig. 2, ext. vent. obl. Fig. 3, juv. LV, ext. lat. (GPIH 1999, 860 µm long).
Scale A (250 µm; x 68), figs. 1 - 3.



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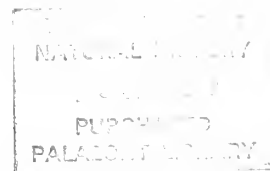
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edited by R. H. Bate, J. W. Neale, Lesley M. Sheppard
and David J. Siveter

Volume 5, Part 2; 22nd December 1978



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ON *LESLEYA BATHONICA* BATE gen. et sp. nov.

by Raymond H. Bate
(British Museum [Natural History], London)

Genus *LESLEYA* gen. nov.

Type species: *Lesleya bathonica* sp. nov.

Gender: Feminine.

Derivation of name: After Lesley Sheppard, my colleague working on Jurassic ostracods.

Diagnosis: Genus of Trachycytheridae having quadrate to rectangular outline in lateral view: dimorphic. Carapace compressed in dorsal view. Shell ornamented with ridges, small terminal nodes and distinct eye node. Hinge weakly entomodont. Radial pore canals straight, few in number. Inner margin and line of concrescence coincide. Muscle scars having four adductor scars, antero-ventral mandibular scar and large antero-dorsal frontal scar composed of single, large, elongate scar with smaller, anterior, subsidiary scar. Left valve slightly larger than right.

Explanation of Plate 5, 82

Fig. 1, ♀ LV, ext. lat. (holotype, OS 10918, 530 µm long); fig. 2, ♂ LV, ext. lat. (paratype, OS 10919, 580 µm long); fig. 3, juv. LV, ext. lat. (paratype, OS 10922, 490 µm long).
Scale A (100 µm; x 118), fig. 1; scale B (100 µm; x 103), fig. 2; scale C (100 µm; x 122), fig. 3.

Remarks: *Lesleya* bears some external resemblance to *Oligocythereis* Sylvester-Bradley and it is possible that, as in *Oligocythereis*, the frontal scar may be V-shaped in some individuals according to preservation. *Lesleya*, however, differs in lacking the external muscle scar node of the Trachyleberididae and by having simple, straight radial pore canals fewer in number than exists for *Oligocythereis*. For these reasons *Lesleya* cannot be placed in the Trachyleberididae and appears to fit naturally into the Trachycytheridae. *Lesleya* is presently monotypic, the type species: *L. bathonica* being restricted to the White Limestone/Forest Marble horizon of the Upper Bathonian.

Lesleya bathonica sp. nov.

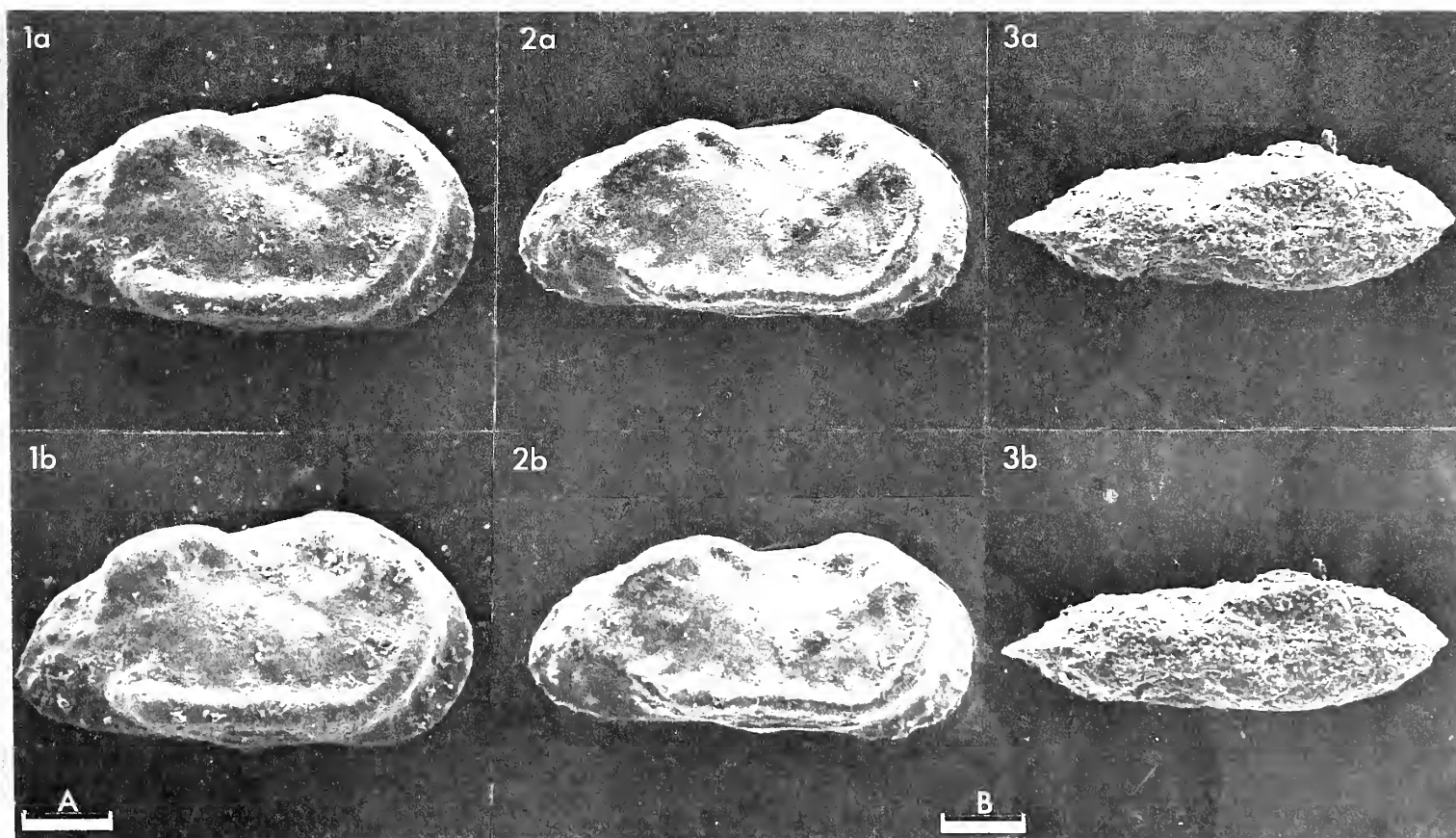
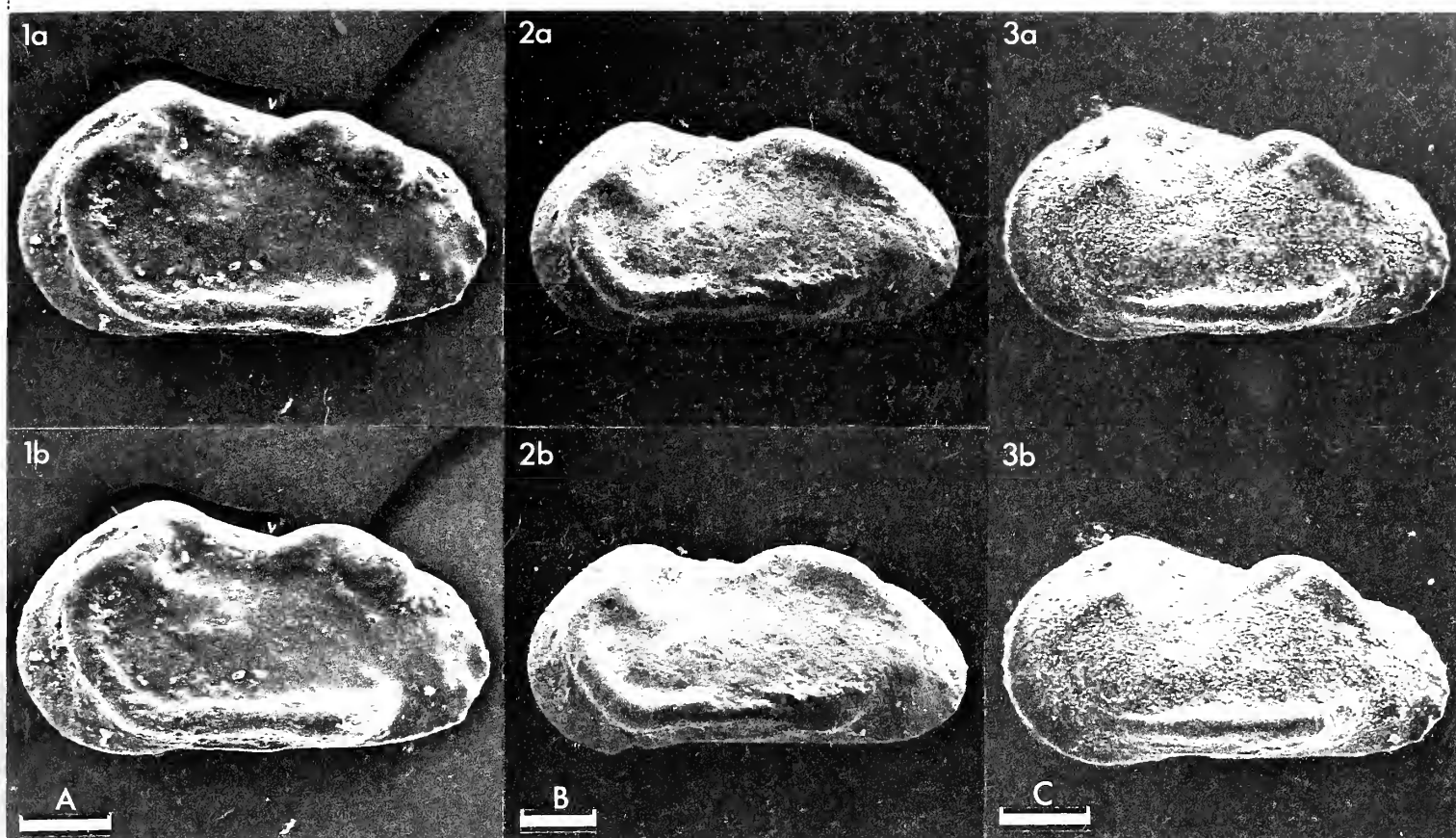
Holotype: Brit. Mus. (Nat. Hist.) OS.10918, ♀ L.V.
[Paratypes: Brit. Mus. (Nat. Hist.) OS 10919 - 10940].

Type locality: Middle Jurassic, Upper Bathonian, ostracod Zone 6, Wychwood Beds, Forest Marble, Old Cement Quarry, Kirtlington, Oxfordshire, England. Grid Ref.: SP 49451985.

Figured specimens: Brit. Mus. (Nat. Hist.) OS.10918 (holotype, ♀ LV: Pl. 5, 82, fig. 1), OS.10919 (♂ LV: Pl. 5, 82, fig. 2), OS.10920 (♀ RV: Pl. 5, 84, fig. 1; rad. pore can.: Text-fig. 1B), OS.10921 (♂ RV: Pl. 5, 84, fig. 2), OS.10922 (juv. LV: Pl. 5, 82, fig. 3), OS.10923 (♀ RV: Pl. 5, 86, fig. 1; Pl. 5, 88, fig. 4), OS.10924 (♂ car.: Pl. 5, 84, fig. 3), OS.10925 (♀ LV: Pl. 5, 86, fig. 1), OS.10926 (♀ car.: Pl. 5, 88, fig. 1), OS.10927 (♀ RV: Pl. 5, 88, fig. 2), OS.10928 (♀ LV: Pl. 5, 86, fig. 3), OS.10929 (♂ LV: Pl. 5, 88, fig. 3), OS.10930 (♀ LV; musc. sc.: Text-fig. 1A).

Explanation of Plate 5, 84

Fig. 1, ♀ RV, ext. lat. (paratype, OS 10920, 510 µm long); fig. 2, ♂ RV, ext. lat. (paratype, OS 10921, 560 µm long); fig. 3, ♂ car. dors. (paratype, OS 10924, 540 µm long).
Scale A (100 µm; x 117), fig. 1; scale B (100 µm; x 110), figs. 2, 3.



Diagnosis: Carapace small, dimorphic; strikingly ornamented with prominent anterior ridge that runs, in adults, from eye node, round anterior margin, to extend back along ventro-lateral margin; juveniles often have incomplete anterior ridge; short, curved, postero-dorsal ridge projects above dorsal margin. Shell surface smooth, small nodes sometimes present at anterior and posterior ends. Approximately seven anterior radial pore canals. Muscle scars as for genus. Normal pore canals simple. Left valve overlaps right along ventral margin.

Remarks: *Lesleya bathonica* is a small but striking ostracod that is restricted to the Upper Bathonian (Range: top of White Limestone to Wychwood Beds of the Forest Marble) of the Oxfordshire Area. Ecologically the species appears to inhabit those levels of the Upper Bathonian that were deposited in shallow water, close to land and where fresh-water ostracods are associated (washed-in?) with a more marine fauna. It is possible, therefore, that conditions of deposition were not fully marine and could have been brackish. Interestingly the three localities from which *Lesleya bathonica* has been recorded; Croughton, Kirtlington and Milton-under-Wychwood all lie on a NE-SW line that was probably close to the old Jurassic shoreline.

Explanation of Plate 5, 86

Fig. 1, ♀ RV, int. lat. (paratype, OS 10923, 520 μm long); fig. 2, ♀ LV, int. lat. (paratype, OS 10925, 500 μm long); fig. 3, ♂ LV, ext. lat. (paratype, OS 10928, 570 μm long).

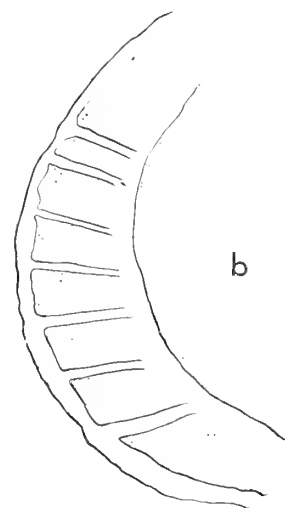
Scale A (100 μm ; x 115), fig. 1; scale B (100 μm ; x 120), fig. 2; scale C (100 μm ; x 105), fig. 3.



Muscle scars, paratype OS 10930, female left valve, length 490 μm . White Limestone, Croughton, Oxfordshire.

Text-fig. 1

62.5 μm

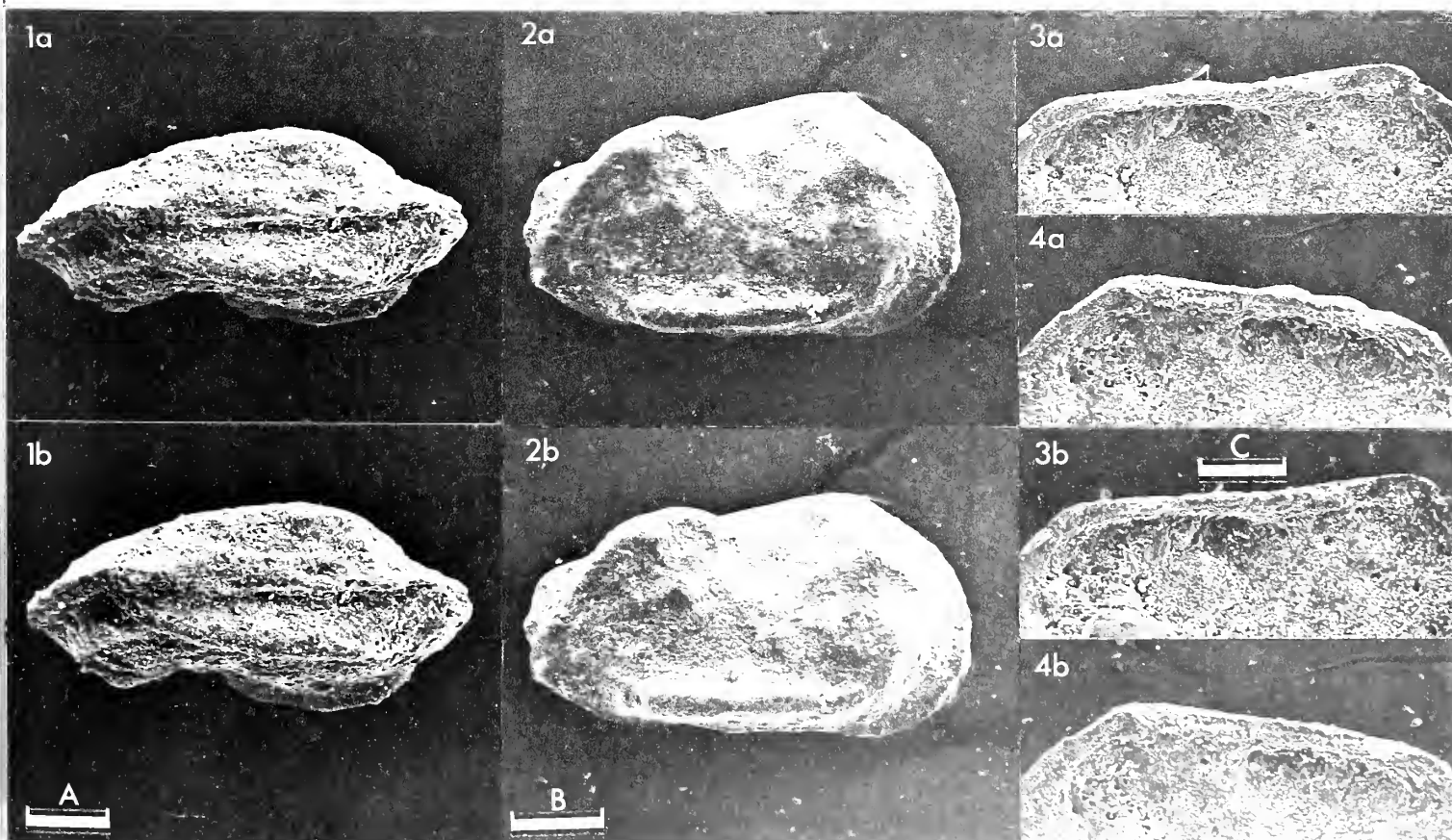
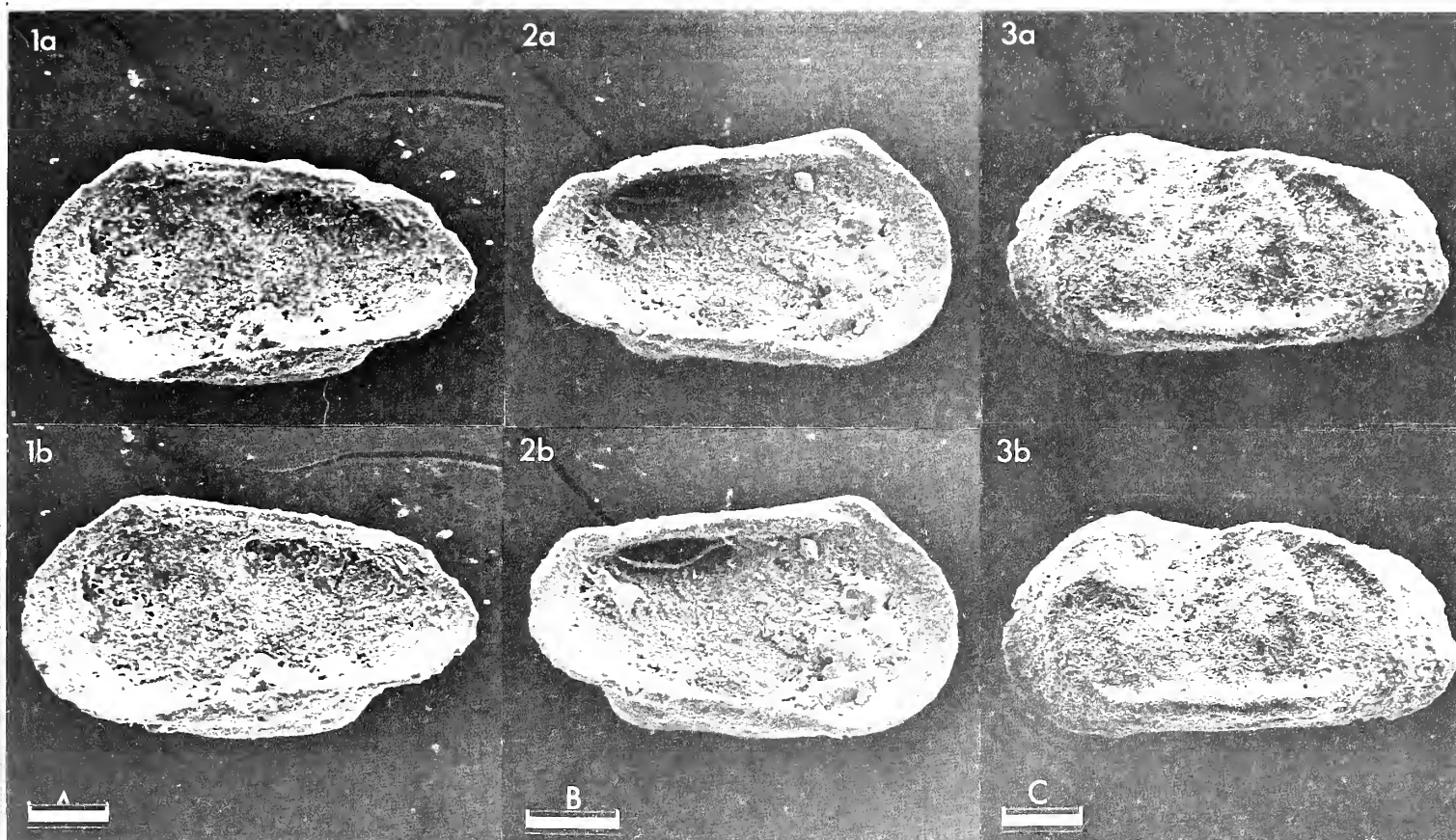


Anterior radial pore canals, paratype OS 10920, female right valve, length 510 μm . Forest Marble, Kirtlington, Oxfordshire.

Explanation of Plate 5, 88

Fig. 1, ♀ car. vent. (paratype, OS 10926, 544 μm long); fig. 2, ♀ RV, ext. lat. (paratype, OS 10927, 493 μm long); fig. 3, ♂ LV, hinge (paratype, OS 10929); fig. 4, ♀ RV, hinge (paratype, OS 10923).

Scale A (100 μm ; x 110), fig. 1; scale B (100 μm ; x 120), fig. 2; scale C (100 μm ; x 115), figs. 3, 4.



ON *MICROPNEUMATOCY THERE BREND AE* SHEPPARD sp. nov.

by Lesley M. Sheppard
(British Museum [Natural History], London)

Micropneumatocythere brendae sp. nov.

1978 *Micropneumatocythere* sp. A; R.H. Bate, in: *A stratigraphical Index of British Ostracoda*, Seel House Press, Liverpool, 234, pl. 5, figs. 8 - 10, 15, 16.

Holotype: Inst. Geol. Sci. **MPK 2168**, ♀ LV.

[Paratypes: Inst. Geol. Sci. **MPK 2169 - 2181**].

Type locality: Upper Fuller's Earth, Bathonian; Swainswick Borehole, depth 23.00 - 24.90m, Somerset, England. Grid Ref.: ST 75766907.

Derivation of name: After Brenda Coleman of the Institute of Geological Sciences.

Explanation of Plate 5, 90

Fig. 1, ♀ LV, ext. lat. (holotype, **MPK 2168**, 459 µm long); fig. 2, ♀ RV, ext. lat. (paratype, **MPK 2170**, 480 µm long); fig. 3, ♀ car., ext. dors. (paratype, **MPK 2173**, 460 µm long).

Scale A (100 µm; x 130), fig. 1; scale B (100 µm; x 125), fig. 2, scale C (100 µm; x 130), fig. 3.

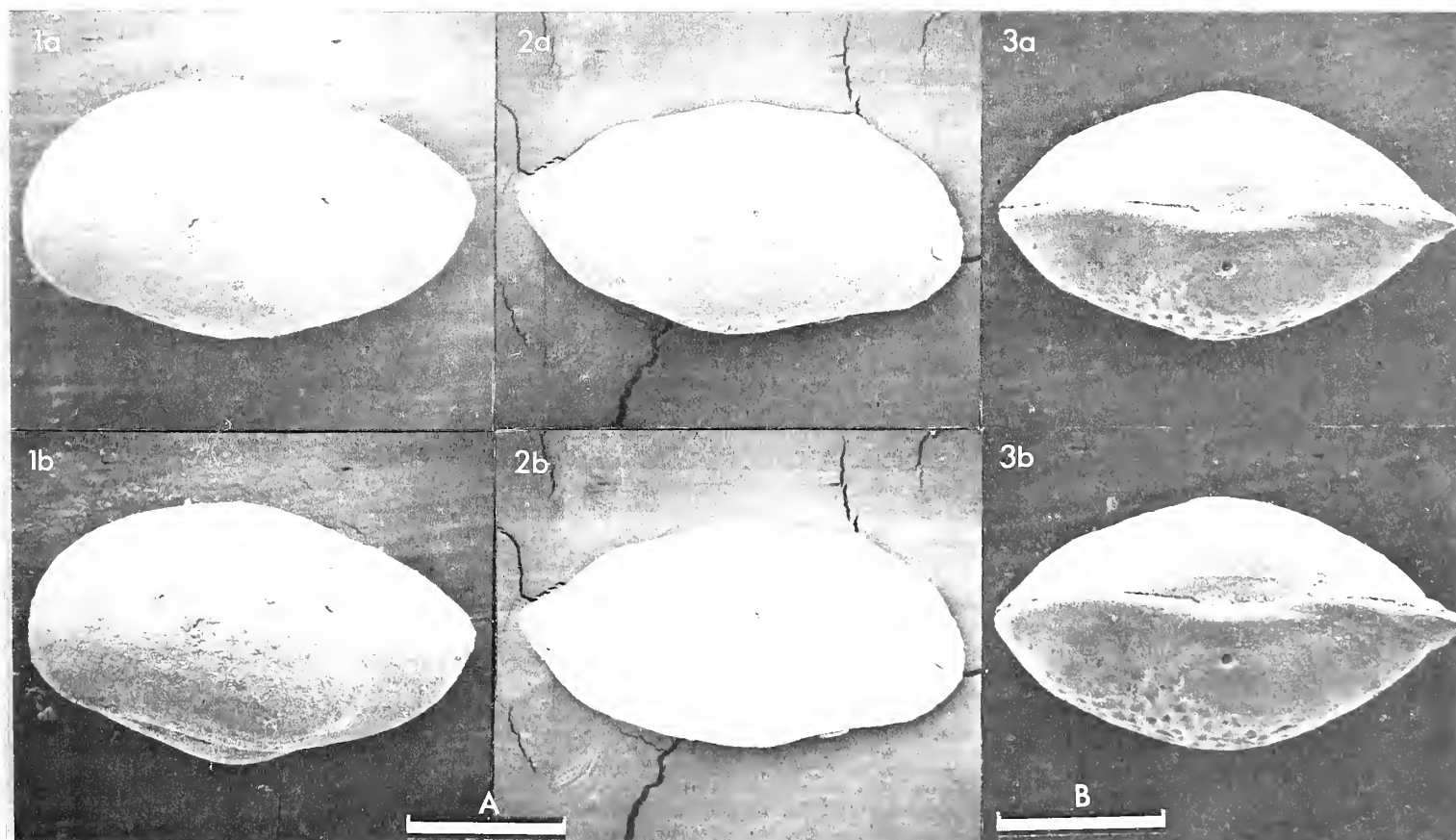
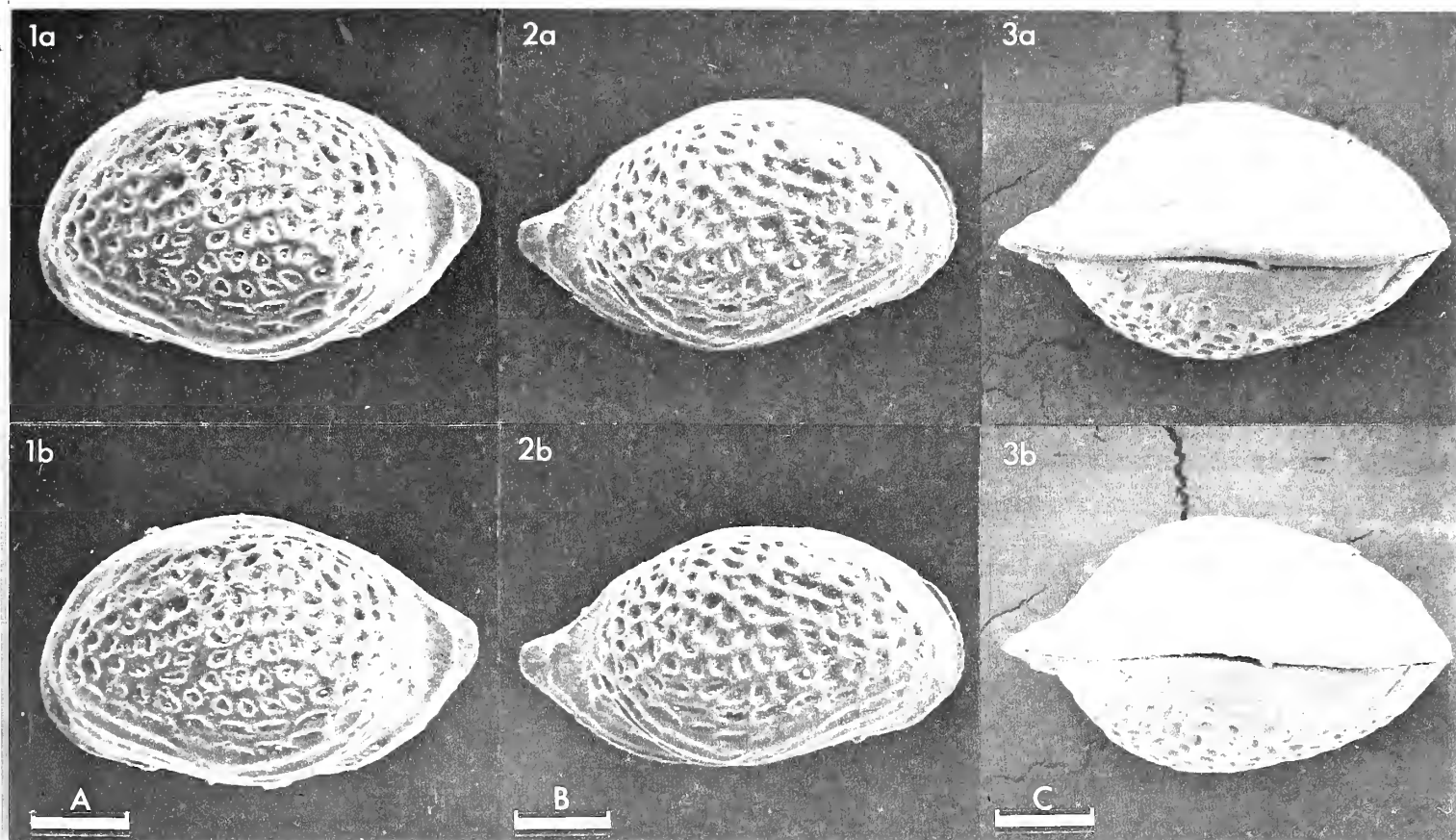
Figured specimens: Inst. Geol. Sci. nos. **MPK 2168** (holotype, ♀ LV: Pl. 5, 90, fig. 1; Pl. 5, 94, fig. 3), **MPK 2170** (♀ RV: Pl. 5, 90, fig. 2; Pl. 5, 94, fig. 2), **MPK 2171** (♀ LV: Pl. 5, 96, fig. 1), **MPK 2173** (♀ car.: Pl. 5, 90, fig. 3), **MPK 2174** (♀ car.: Pl. 5, 96, fig. 2), **MPK 2175** (♀ LV: Pl. 5, 96, fig. 3), **MPK 2177** (♂ car.: Pl. 5, 92, fig. 3), **MPK 2178** (♂ RV: Pl. 5, 92, fig. 2), **MPK 2179** (♂ car.: Pl. 5, 92, fig. 1), **MPK 2181** (♂ RV: Pl. 5, 94, fig. 4). Brit. Mus. (Nat. Hist.) no. **OS 9056** (♀ LV: Pl. 5, 94, fig. 1; Text-fig. 1a). **MPK 2168**, **MPK 2170**, **MPK 2177** are from the same depth at the type locality; **MPK 2178**, **MPK 2179** are from depth 15.28 - 18.05m; **MPK 2170**, **MPK 2173** are from depth 45.54 - 47.00m, Frome Borehole, Somerset, England, Grid Ref.: ST 76324769. **MPK 2174** is from depth 25.90 - 26.20m, and **MPK 2175** and **MPK 2181** are from depth 21.40 - 21.70m, Horsecombe Vale Borehole 15, Somerset, England, Grid Ref.: ST 755622. **OS 9056** is from depth 15.00m, Lyme Bay Borehole 74/35, off Dorset, England, approx. lat. 50° 37.09'N, long. 2° 43.05'W. All specimens are Upper Fuller's Earth, Bathonian in age. Also figured is one specimen of *M. falcata* Sheppard, Brit. Mus. (Nat. Hist.) no. **OS 10941** (♀ LV: Text-fig. 1b), White Limestone, Bathonian, Croughton Quarry, Oxfordshire, England.

Diagnosis: Ornate species of *Micropneumatocythere*, ornamentation comprising 3 or 4 - sided pits, resembling reticulation. Dorsal margin highly arched with steep posterodorsal slope. Carapace strongly convex with well developed caudal process in both male and female.

Explanation of Plate 5, 92

Fig. 1, ♂ car., ext. lt. lat. (paratype, **MPK 2179**, 560 µm long); fig. 2, ♂ RV, ext. lat. (paratype, **MPK 2178**, 560 µm long); fig. 3, ♂ car., ext. dors. (paratype, **MPK 2177**, 527 µm long).

Scale A (200 µm; x 214), figs. 1, 2; scale B (200 µm; x 226), fig. 3.



Remarks: This is the most highly ornate of all species of *Micropneumatocythere* and is important stratigraphically as it is used as the index species of ostracod zone 4 in the current zonation of the British Bathonian (see Bate 1978). Smooth forms do, however, occur in which the ornament is totally lacking (compare Pl. 5, 90 fig. 1 with Pl. 5, 96, fig. 1) and these very closely resemble *M. falcata* into which they probably evolved (*Stereo-Atlas of Ostracod Shells* 1978, 5 (14) 97 - 100). The two species may be distinguished in two ways:

(1) on dorsal outline; *M. brendae* is more strongly arched dorsally and has a much steeper posterodorsal slope.

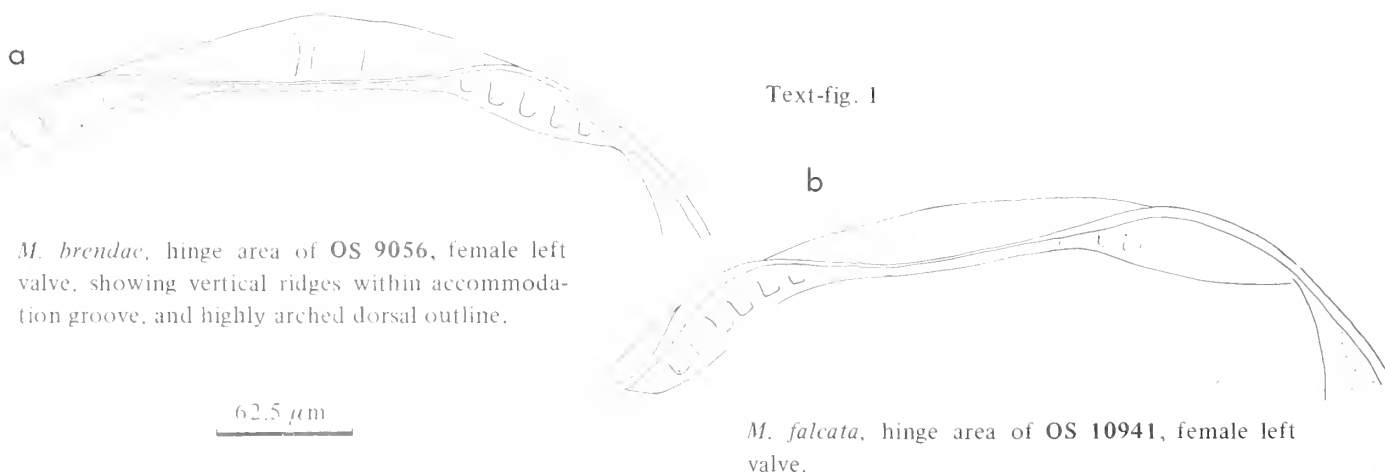
(2) within the accommodation groove of the left valve of *M. brendae* can be seen one prominent centrally situated vertical ridge and one or two smaller, less well defined, ridges on either side (see Text-fig. 1a). These structures are not found in *M. falcata* (see Text-fig. 1b), nor indeed in any other species of the genus. I suggest that they served as an additional reinforcement of the hinge restricting movement of the valves when closed. Complimentary depressions in the dorsal edge of the right valve have not as yet been observed, however, due mainly to poor preservation of this part of the shell. The ridges may have developed as a result of inhabiting the high energy inner-shelf, near-shore environment that was in existence during Upper Fuller's Earth times. The coarse ornamentation would support this idea. Evolution to *M. falcata* would have been achieved with the smooth forms of *M. brendae* as an intermediate stage, and was accompanied by a change in environment to a much quieter shallow-water habitat. Correspondingly the carapace ornament was lost, so too were the ridges within the accommodation groove.

Explanation of Plate 5, 94

Fig. 1, ♀ LV, int. lat. hinge (OS 9056); fig. 2, ♀ RV, int. lat. hinge (paratype, MPK 2170); fig. 3, ♀ LV, ext. lat. ornament (holotype, MPK 2168); fig. 4, ♂ RV int. lat. musc. sc. (paratype, MPK 2181).

Scale A (100 µm; x 280), fig. 1; scale B (100 µm; x 318), fig. 2; scale C (50 µm; x 326), fig. 3; scale D (10 µm; x 847), fig. 4.

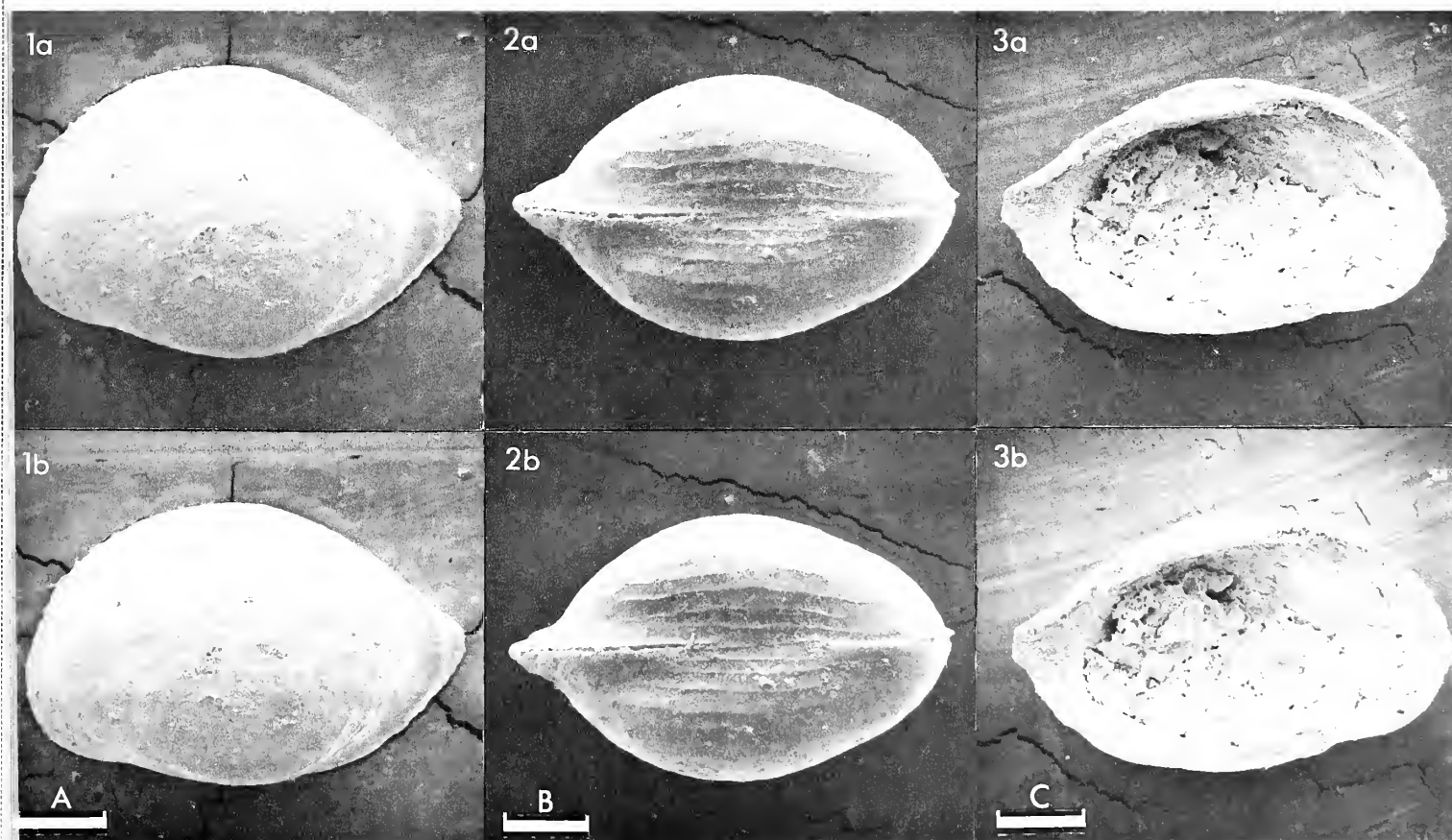
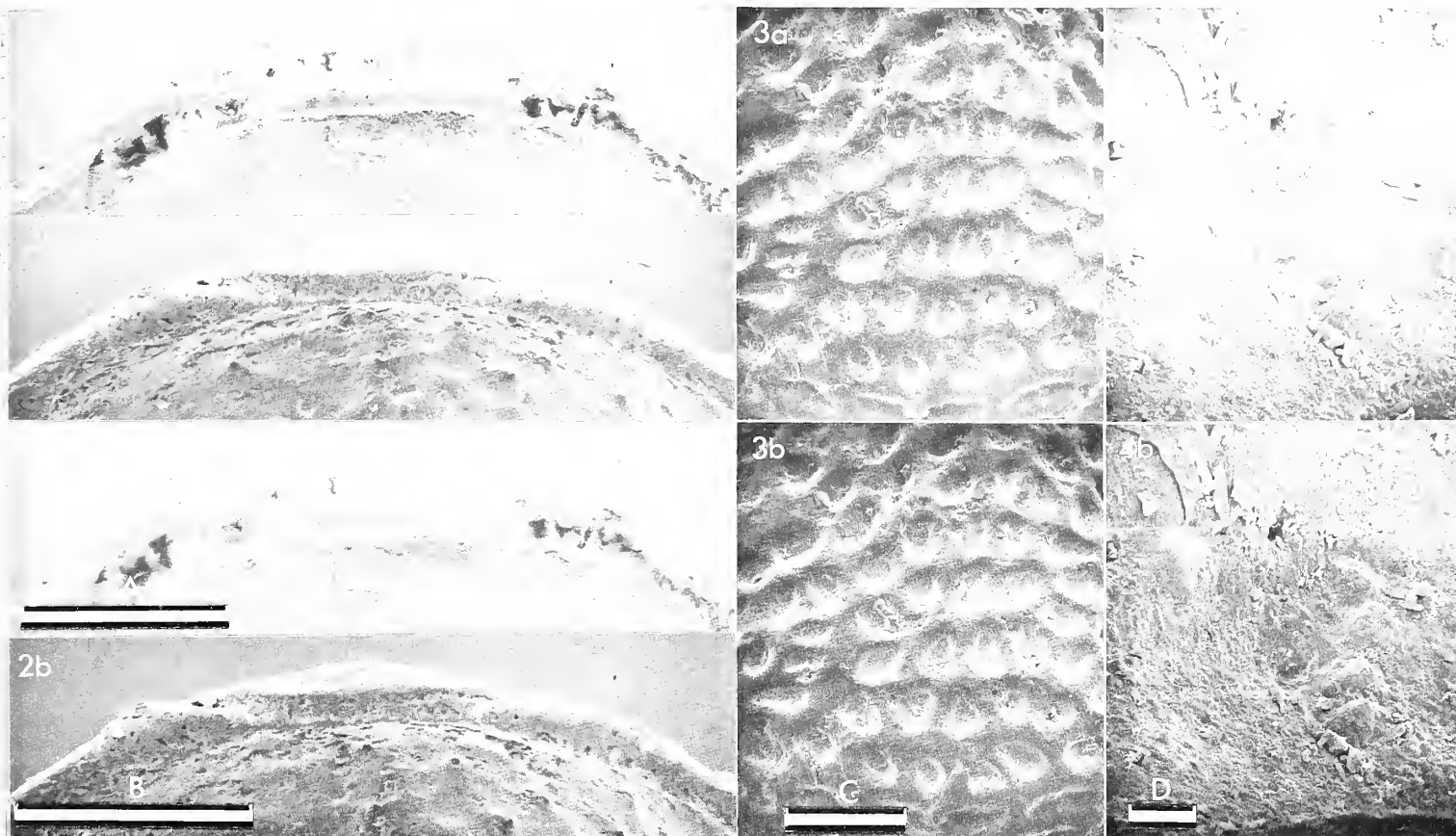
Distribution: A marine species, common in the Upper Fuller's Earth sequence in SW England at those localities already listed, and also one occurrence in the Upper Estuarine Series at Norwich, Norfolk, England. This latter occurrence is useful in correlating the marine sequence in the south with the more brackish beds further north. *M. brendae*, first appearing at the base of ostracod zone 4 of Bate, ranges from *hodsoni* to *aspidoides* ammonite zones.



Explanation of Plate 5, 96

Fig. 1, ♀ LV, ext. lat. (paratype, MPK 2171, 501 µm long); fig. 2, ♀ car., ext. vent. (paratype, MPK 2174, 490 µm long); fig. 3, ♀ LV, int. lat. (paratype, MPK 2175, 518 µm long).

Scale A (100 µm; x 119), fig. 1; scale B (100 µm; x 112), fig. 2; scale C (100 µm; x 115), fig. 3.



ON *MICROPNEUMATOCY THERE FALCATA* SHEPPARD sp. nov.

by Lesley M. Sheppard
(British Museum [Natural History], London)

Micropneumatocythere falcata sp. nov.

1978 *Micropneumatocythere* sp. E; R.H. Bate, in: *A Stratigraphical Index of British Ostracoda*, Seel House Press, Liverpool, 234 (not Pl. 5, figs. 11 - 14).

Holotype: Brit. Mus. (Nat. Hist.) OS 9305, ♀ RV.

[Paratypes: Brit. Mus. (Nat. Hist.) OS 9306 - 9314]

Type locality: Forest Marble, Upper Bathonian, Kirtlington Quarry, Oxfordshire, England, Grid Ref.: SP 494198.

Derivation of name: Latin, *falcatus*, meaning sickle-shaped, referring to the dorsal margin.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. OS 9305 (holotype, ♀ RV: Pl. 5, 98, fig. 1), OS 9306 (♀ LV: Pl. 5, 98, fig. 2), OS 9308 (♀ RV: Pl. 5, 98, fig. 3), OS 9311 (♂ LV: Pl. 5, 100, fig. 2), OS 9312 (♂ car.: Pl. 5, 100, fig. 3), OS 9313 (♂ car.: Pl. 5, 100, fig. 1). OS 9305, OS 9306, OS 9312 and OS 9313 are from the type level and locality. OS 9308 is from the top of the White Limestone, Croughton Quarry, Oxfordshire. Grid Ref.: SP 602255. OS 9311 is from the Forest Marble, Shipton-on-Cherwell, Oxfordshire. Grid Ref.: SP 475175.

Explanation of Plate 5, 98

Fig. 1, ♀ RV, ext. lat. (holotype, OS 9305, 493, μ m long); fig. 2, ♀ LV, ext. lat. (paratype, OS 9306, 476 μ m long); fig. 3, ♀ RV, int. lat. (paratype, OS 9308, 476 μ m long).

Scale A (100 μ m; x 121), fig. 1; scale B (100 μ m; x 126), figs. 2, 3.

Diagnosis: Species of *Micropneumatocythere* with sickle-shaped dorsal outline in female dimorph; anterior broadly rounded, posterior triangular. Shell surface smooth with large, widely-spaced normal pore canals.

Remarks: Hinge, muscle scars and radial pore canals as for genus. There are several (at least 6) parallel ridges running along the ventral and ventrolateral surfaces.

M. falcata is important stratigraphically as its first appearance is used to identify the base of ostracod zone 6 in the current zonation of the British Bathonian (see Bate 1978). It is considered to have evolved from smooth forms of *M. brendae* Sheppard which occur at the top of zone 5; indeed an excellent phylogenetic lineage can be traced from *M. brendae* to *M. falcata*: for details see *Stereo-Atlas of Ostracod Shells* 1978, 5 (13) 89 - 96.

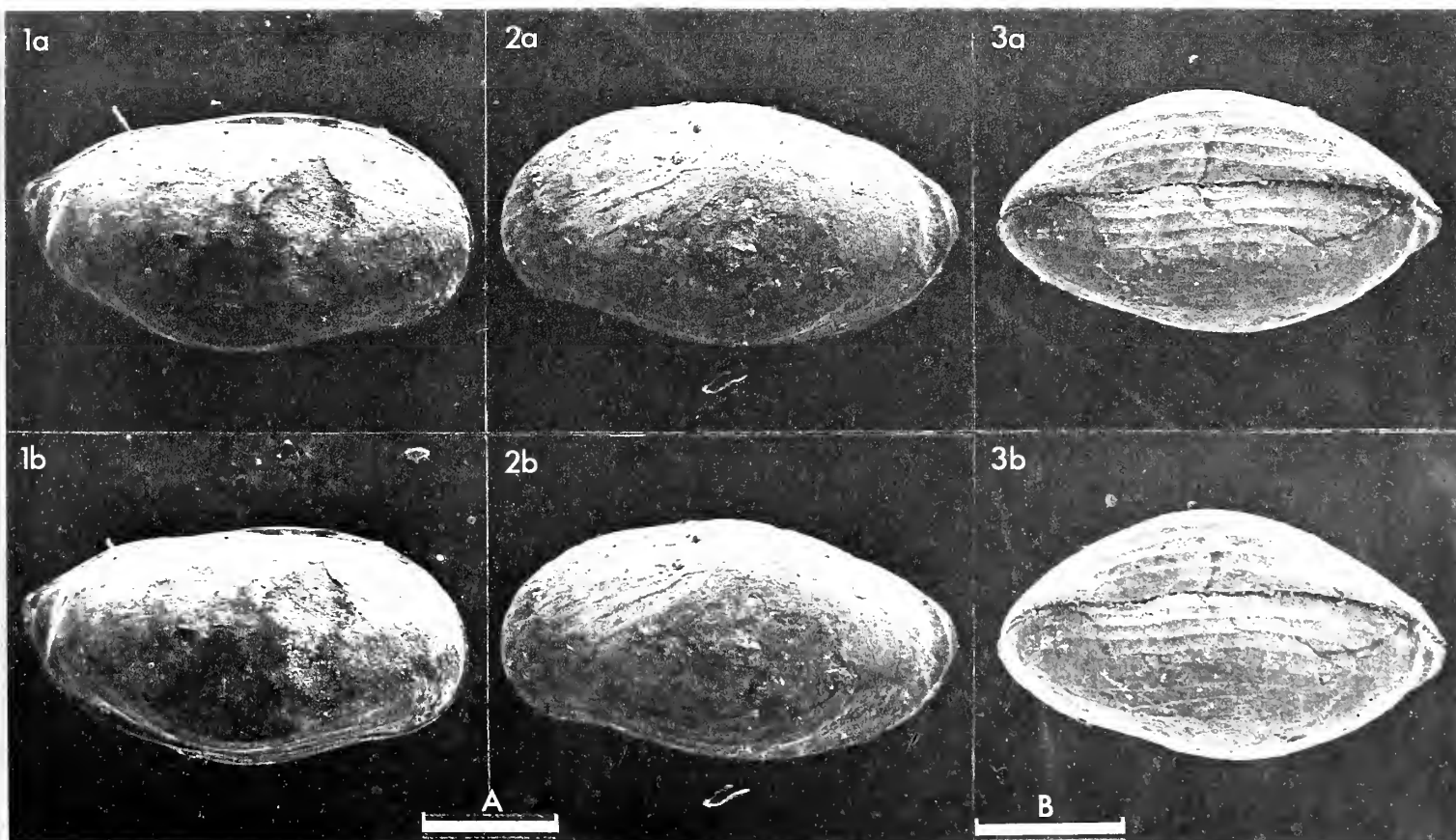
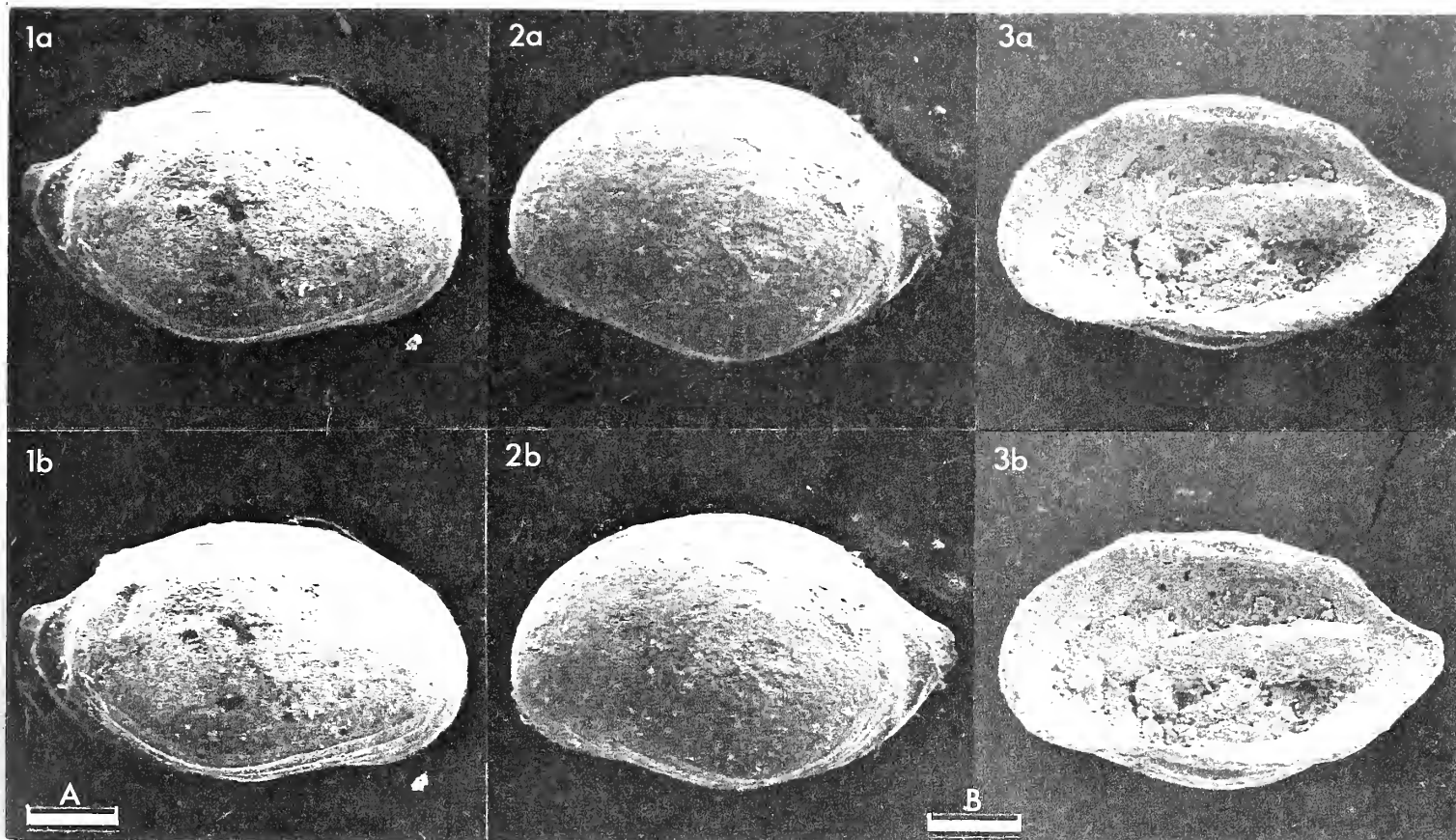
M. falcata is considered a marine to brackish-water species, sedimentological and macrofossil evidence suggesting it favoured a shallow water environment.

Distribution: *M. falcata* has been found to range from the top of the White Limestone and throughout the Forest Marble (*discus ammonite* zone) in the Oxfordshire, Kent and Dorset areas of S England only.

Explanation of Plate 5, 100

Fig. 1, ♂ car., ext. rt. lat. (paratype, OS 9313, 680 μ m long); fig. 2, ♂ LV, ext. lat. (paratype, OS 9311, 654 μ m long); fig. 3, ♂ car., ext. vent. (paratype, OS 9312, 591 μ m long).

Scale A (200 μ m; x 90), figs. 1, 2; scale B (200 μ m; x 100), fig. 3.



ON *APATOCY THERE SPINOSA* NEALE

by John W. Neale
(University of Hull, England)

Apatocythere spinosa Neale, 1962

1962 *Apatocythere spinosa* sp. nov. J.W. Neale, *Micropaleontology* 8 (4), 441, pl. 5, figs. 3, 9, pl. 6, fig. 5, pl. 13, figs. 1 - 4 21 - 22.

1966 *Apatocythere (Apatocythere) spinosa* Neale 1962; J. Gründel, *Freiberger ForschHft., ser. C*, 200, 20, pl. 3, fig. 4, text-figs. 3a, b (q.v. for synonymy of forms earlier placed elsewhere but which may belong here).

Holotype: University of Hull coll. **HU.1.C.22.10**, ♀ LV.

Type locality: Coastal Section, Bed D2D, 1ft above the base, Speeton Clay, Speeton, E Yorkshire, England; lat. 54° 10' N, long. 0° 14' 40" W. *Lyticoceras amblygonium* Zone, Lower Hauterivian, Lower Cretaceous.

Figured specimens: University of Hull coll. nos. **HU.13.C.4.69** (♀ LV: Pl. 5, 102, fig. 1), **HU.13.C.4.41** (♂ LV: Pl. 5, 102, fig. 2) **HU.13.C.4.31** (♀ RV: Pl. 5, 104, fig. 1), **HU.13.C.4.42** (♂ RV: Pl. 5, 104, fig. 2). All the figured specimens from the type locality and type horizon.

Explanation of Plate 5, 102

Fig. 1, ♀ LV, ext. lat. (paratype, **HU.13.C.4.69**, 664 µm long); fig. 2, ♂ LV, ext. lat. (paratype, **HU.13.C.4.41**, 792 µm long). Scale A (100 µm; x 133), fig. 1; scale B (100 µm; x 117), fig. 2.

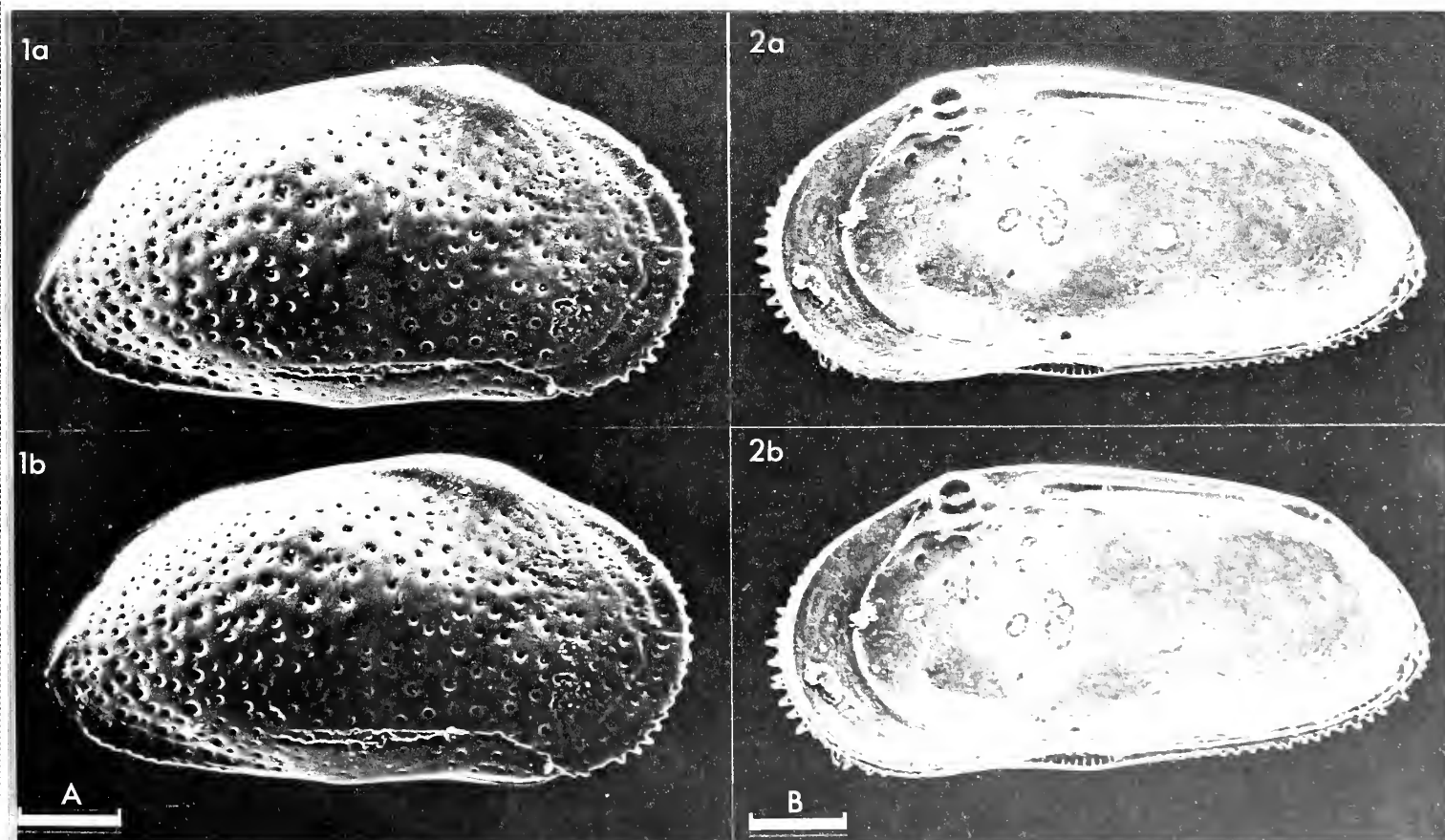
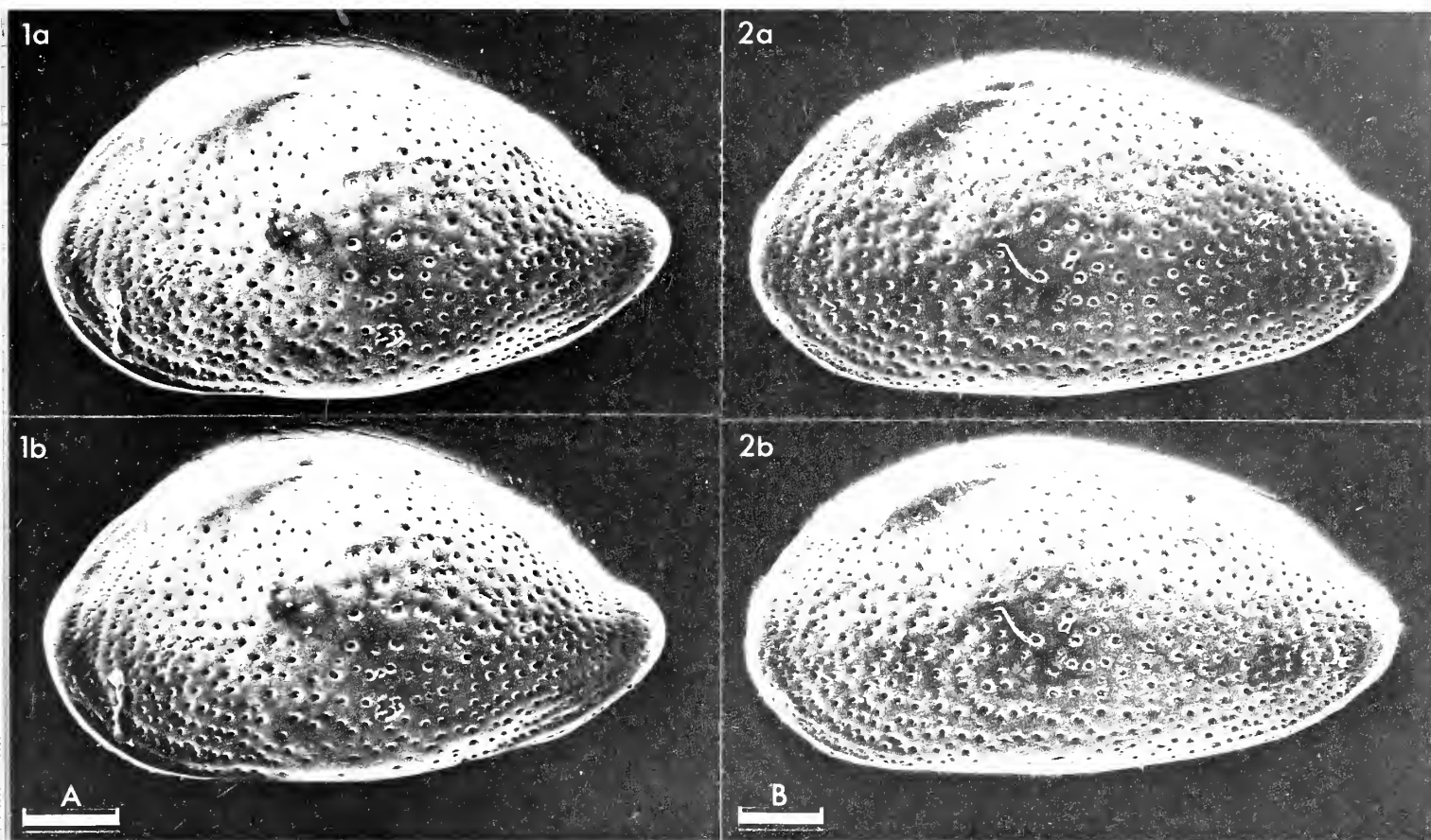
Diagnosis: Smoothly ovate in lateral outline with concave postero-dorsal margin and rounded, upturned posterior point. Anterior and posteroventral margins with small spines, best seen on the right valve where they affect the lateral outline; in the left valve they occur on the inner edge of the flange where they project inwards rather than laterally. Hinge (Pl. 5, 104, fig. 2) typical of the genus. There is a well developed eye tubercle and strong sexual dimorphism.

Remarks: The external morphology of this species is similar to *Schuleridea lamplughii* Neale, 1962 (op. cit.) which occurs in the same beds and which may be regarded as a homoeomorph (see *Stereo-Atlas of Ostracod Shells* 5 (16) 105, 1978). It differs in the hinge structure and in the presence of small marginal spines. *Apatocythere simulans* Triebel, 1940 (Senckenbergiana), from the German Barremian, is most easily differentiated by the shape of the posterior part of the left valve in lateral view.

Distribution: This is a typical Lower Hauterivian species. It occurs in England in fine-grained, marine sediments rich in pyrite, glauconite and phosphatic material and is also known from East (and probably West) Germany. In both England and Germany it is associated with such well known species as *Cytherelloidea ovata* Weber, *Acrocythere hauteriviana* (Bartenstein), *Paranotocythere diglypta* (Triebel), *Protocythere hechti* Triebel, *P. triplicata* (Roemer) and *Schuleridea lamplughii* Neale.

Explanation of Plate 5, 104

Fig. 1, ♀ RV, ext. lat. (paratype, **HU.13.C.4.31**, 656 µm long); fig. 2, ♂ RV, int. lat. (paratype, **HU.13.C.4.42**, 708 µm long). Scale A (100 µm; x 139), fig. 1; scale B (100 µm; x 131), fig. 2.



ON *SCHULERIDEA LAMPLUGHI* NEALE

by John W. Neale
(University of Hull, England)

Schuleridea lamplughi Neale, 1962

1962 *Schuleridea lamplughi* sp. nov. J.W. Neale, *Micropaleontology* 8 (4), 441, pl. 5, figs. 6, 15, pl. 6, fig. 6, pl. 13, figs. 5 - 8, 23.

1971 *Schuleridea lamplughi* Neale; E. Kemper, *Bull. Centre Rech. Pau - SNPA* 5 suppl., 640 (not figured).

Holotype: University of Hull coll. **HU.1.C.22.15**, ♀ LV.

Type locality: Coastal Section, D2D Bed, 1' above the base, Speeton Clay, Speeton, E Yorkshire, England; lat. 54° 10' N, long. 0° 14' 40" W. *Lyticoceras amblygonium* Zone, Lower Hauterivian, Lower Cretaceous.

Figured specimens: University of Hull coll. nos. **HU.13.C.3.66** (♂ LV: Pl. 5, 106, fig. 1), **HU.1.C.22.15** (♀ LV: Pl. 5, 106, fig. 2), **HU.13.C.3.11** (♂ RV: Pl. 5, 108, fig. 1), **HU.13.C.3.65** (♀ LV: Pl. 5, 108, fig. 2). All the figured specimens from the type locality and type horizon.

Explanation of Plate 5, 106

Fig. 1, ♂ LV, ext. lat. (paratype, **HU.13.C.3.66**, 780 µm long); fig. 2, ♀ LV, ext. lat. (holotype, **HU.1.C.22.15**, 728 µm long). Scale A (100 µm; x 126), fig. 1; scale B (100 µm; x 109), fig. 2.

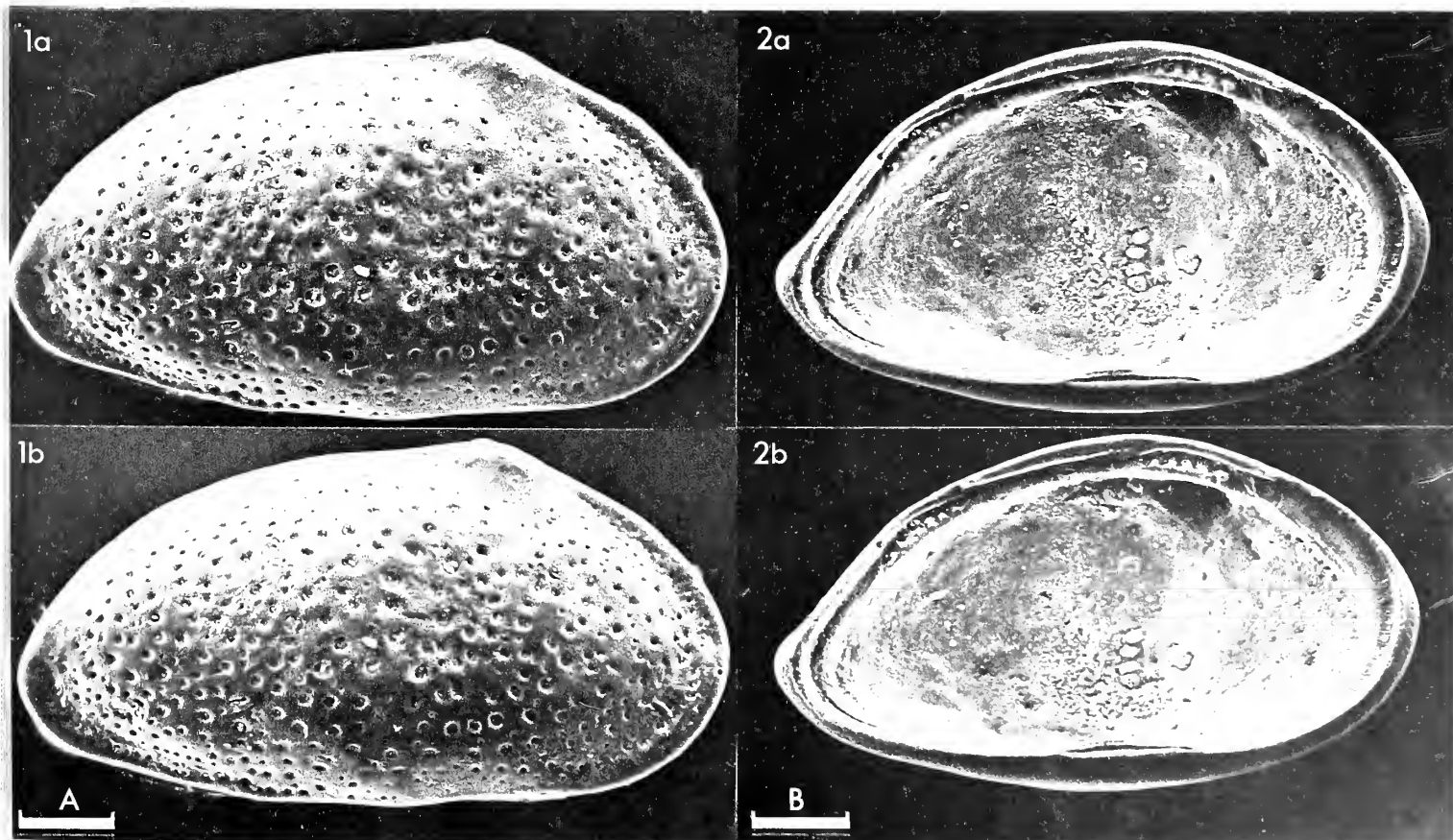
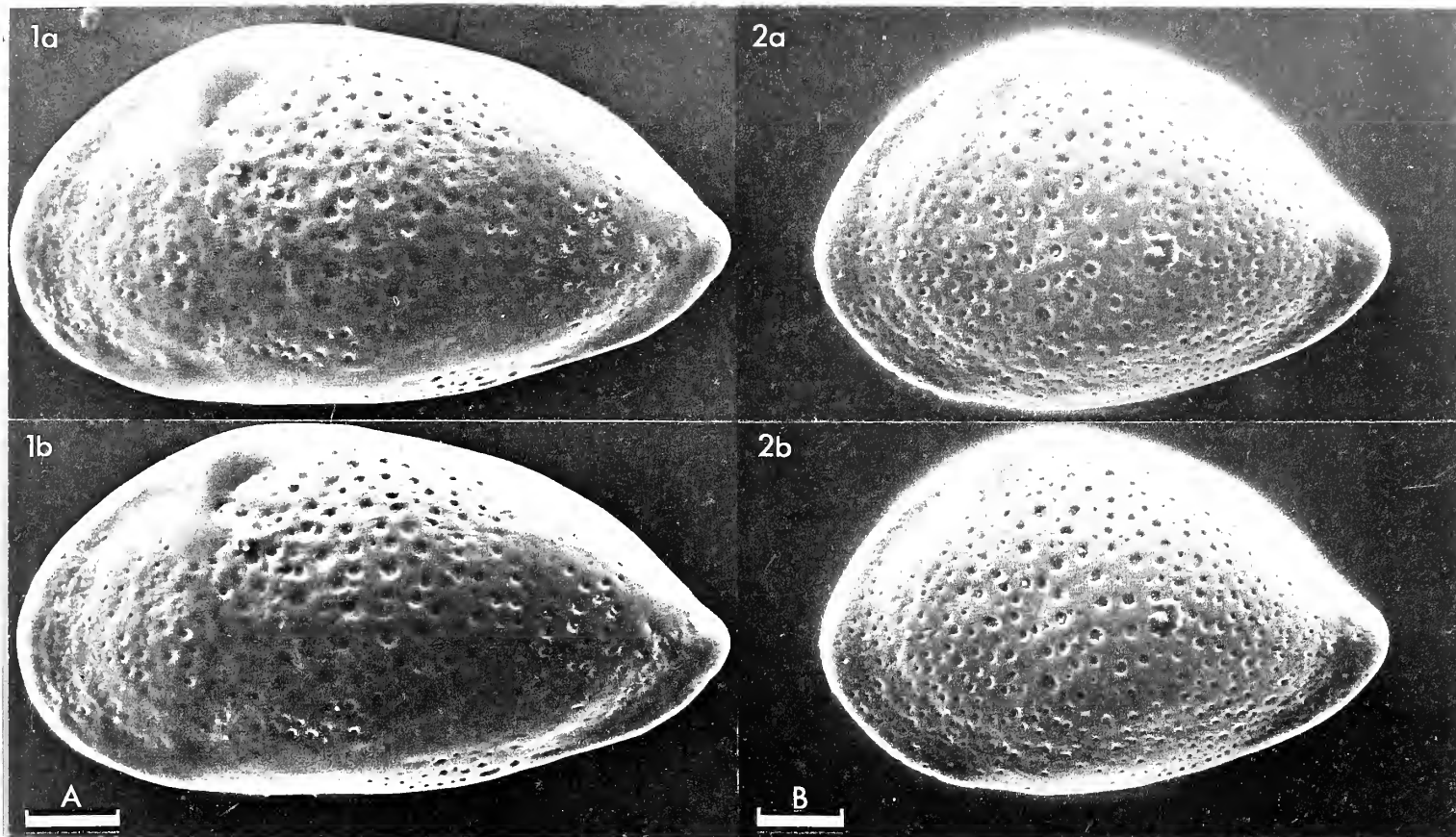
Diagnosis: A *Schuleridea* with asymmetrically rounded anterior margin and upturned caudal termination in the left valve. The elongated, pitted valves taper posteriorly.

Remarks: Based on external morphology this species is a homoeomorph of *Apatocythere spinosa* Neale, 1962 (see *Stereo-Atlas of Ostracod Shells* 5 (15) 101, 1978), from which it is easily differentiated by the hinge structure. It also lacks the marginal spines seen on the right valve of *A. spinosa*.

Distribution: Found in the Lower Hauterivian clays in Britain, it also occurs in the shallow neritic and outer sublittoral sediments of the Lower Saxony Basin of N Germany (Kemper 1971). From the Upper Valanginian and Lower Hauterivian of boreholes in the Kujawy area, Poland, J. Szejn (*Biul. Inst. geol.* 200, 252, pl. 2, figs. 1, 2, 1967.) has described this or a closely allied species as *S. aff. lamplughi* and the same author (*Biul. Inst. geol.* 211, 86, 1969.) has recorded *S. cf. lamplughi* (not figured) from the Lower Hauterivian of the Wałbrzych brickyard, Central Poland.

Explanation of Plate 5, 108

Fig. 1, ♂ RV, ext. lat. (paratype, **HU.13.C.3.11**, 740 µm long); fig. 2, ♀ LV, int. lat. (paratype, **HU.13.C.3.65**, 720 µm long). Scale A (100 µm; x 133), fig. 1; scale B (100 µm; x 125), fig. 2.



ON *SCHULERIDEA JUDDI* NEALE

by John W. Neale
(University of Hull, England)

Schuleridea juddi Neale, 1962

1962 *Schuleridea juddi* sp. nov. J.W. Neale, *Micropaleontology* 8 (4), 439, pl. 5, figs. 1, 4, 7, 10, 13, pl. 6, fig. 4, pl. 13, figs. 17 - 20.

Holotype: University of Hull coll. **HU.1.C.22.43**, ♀ LV.

Type locality: Coastal Section, D6F Bed, Speeton Clay, Speeton, E Yorkshire, England; lat. 54° 10'N, long. 0° 14'40"W. Upper Berriasian, Lower Cretaceous.

Figured specimens: University of Hull coll. nos. **HU.13.C.2.5** (♀ LV : Pl. 5, 110, fig. 1), **HU.13.C.2.100** (♂ LV : Pl. 5, 110, fig. 2), **HU.1.C.22.51** (♀ RV: Pl. 5, 112, fig. 1), **HU.13.C.2.90** (♂ RV: Pl. 5, 112, fig. 2). All the figured specimens are from Bed D6 of the type locality.

Explanation of Plate 5, 110

Fig. 1, ♀ LV, ext. lat. (**HU.13.C.2.5**, 728 µm long); fig. 2, ♂ LV, ext. lat. (**HU.13.C.2.100**, 844 µm long).
Scale A (100 µm; x 110), figs. 1, 2.

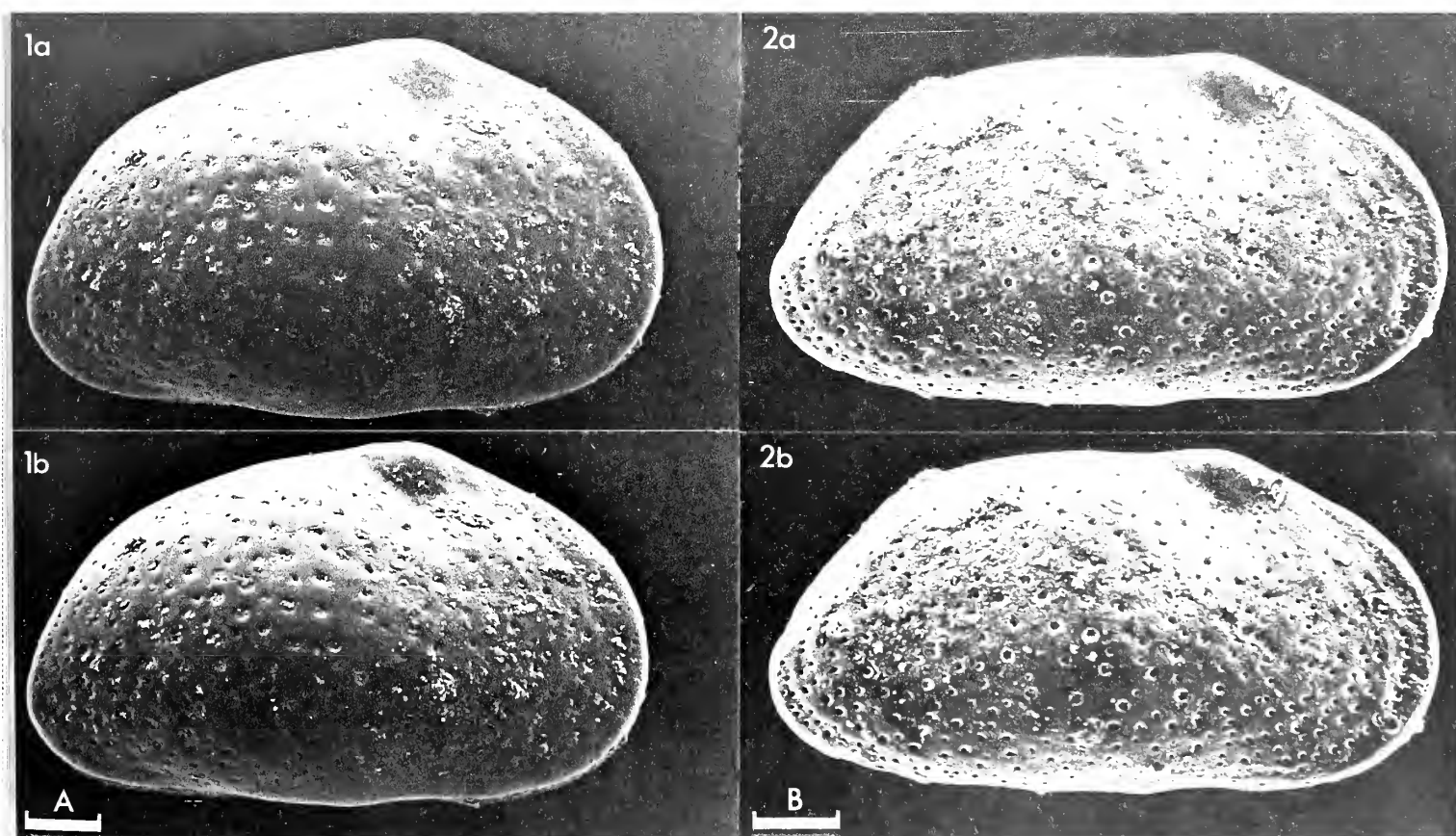
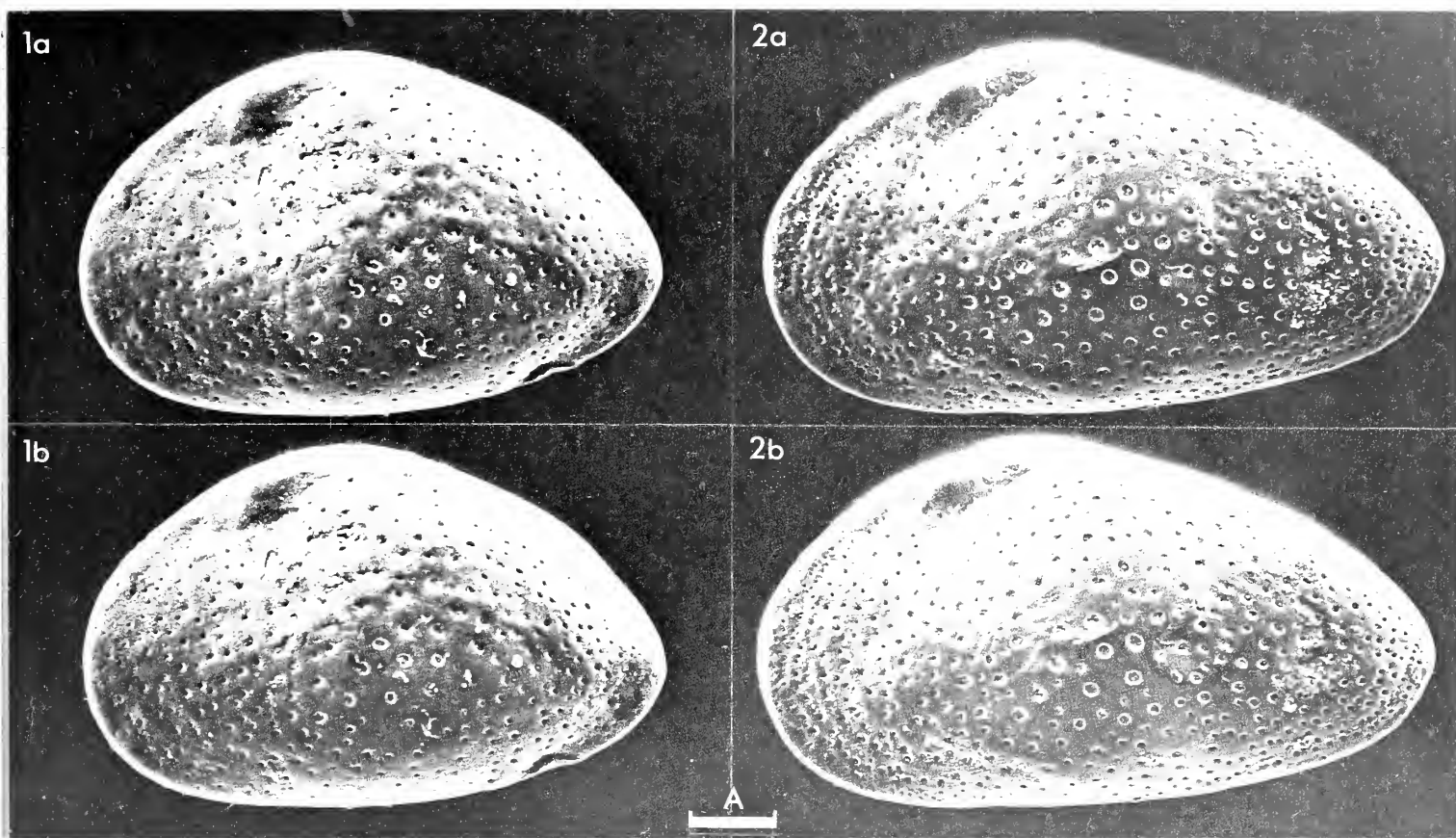
Diagnosis: Elongate-oval, tapering strongly posteriorly in lateral view and with a prominent eye tubercle. Surface pitted, but not as strongly as in *S. praethoerenensis* Bartenstein & Brand, 1959. Strong dimorphism characteristic of the genus.

Distribution: The species is typical of the marine Berriasian of northern England where it is associated with *Galliaccytheridea teres*, *Mandelstamia sexti*, *Cytheroapterina triebeli*, *Paracypris caerulea* and *Paranotacythere speetonensis*.

O.B. Christensen (*Geosci. Man* 6, 105, 1964) states that *S. juddi* does not occur in the *G. teres* zone in the Danish Embayment, where its place appears to be taken by *S. praethoerenensis*. In Poland, J. Szejn (*Biul. Inst. geol.* 211, 86, 1969) has recorded *S. juddi* (not figured) from the Lower Hauterivian of the Wawł brickyard but this horizon is anomalously high and the specimens would merit re-examination. In Portugal, from the Sierra de Sintra and adjoining areas, J. Rey *et al.* (*C.R. Somm. Seanc. Soc. Géol. France* 5, 153, 1968) have recorded *S. aff. S. juddi* but this taxon needs further investigation. Further south, M. Benest *et al.* (*Géobios, Lyon* 10 (2), 215, pl. 9, figs. 8, 9, 1977) have figured as *S. aff. juddi* a closely comparable form from the Upper Berriasian of the Lamoricière Region, Algeria.

Explanation of Plate 5, 112

Fig. 1, ♀ RV, ext. lat. (paratype, **HU.1.C.22.51**, 870 µm); fig. 2, ♂ RV, ext. lat. (**HU.13.C.2.90**, 800 µm long).
Scale A (100 µm; x 100), fig. 1; scale B (100 µm; x 118), fig. 2.



ON *SCHULERIDEA PRAETHOERENENSIS* BARTENSTEIN & BRAND

by John W. Neale
(University of Hull, England)

Schuleridea praethoerenensis Bartenstein & Brand, 1959

1951 *Cytheridea* (*Haplocytheridea*) n.sp. (517). H. Bartenstein & E. Brand, *Abh. senckenb. naturforsch. Ges.* **485**, 331, pl. 14B, fig. 16, pl. 15C, fig. 21, pl. 15D, fig. 48, pl. 20, fig. 2; ? pl. 14C, figs. 54 - 56, pl. 15A, fig. 19.

1959 *Schuleridea praethoerenensis* n. sp. H. Bartenstein & E. Brand in H. Bartenstein, *Paläont. Z.* **33**, 226, pl. 27, fig. 2, pl. 28, figs. 3 - 6.

1962 *Schuleridea praethoerenensis* Bartenstein & Brand; J.W. Neale, *Micropaleontology* **8** (4), 440, pl. 5, figs. 2, 5, 8, 11, 14, pl. 16, figs. 1a, b, 3, pl. 13, figs. 13 - 16.

1973 *Schuleridea* (*Schuleridea*) *praethoerenensis* Bartenstein & Brand; O.B. Christensen, *Geol. Surv. Denmark III Series* **40**, 116 (not figured).

1974 *Schuleridea praethoerenensis* Bartenstein; O.B. Christensen, *Geosci. Man* **6**, 105 *et seq.* (not figured).

Holotype: In the personal collections of Dr. H. Bartenstein, W Germany; ♀ LV.

Type locality: Core from 173.6 - 177m, Voigtei no. 2 borehole, NW Germany; lat. 52° 36' 19"N, long. 8° 56' 51"E, 60 km WNW of Hannover and 55 km SSE of Brenen. Mittel-Valendis 2, Valanginian, Lower Cretaceous.

Explanation of Plate 5, 114

Fig. 1, ♀ LV, ext. lat. (HU.1.C.29.49, 692 µm long); fig. 2, ♂ LV, ext. lat. (HU.1.C.29.28, 792 µm long).

Scale A (100 µm; x 98), fig. 1; scale B (100 µm; x 106), fig. 2.

Figured specimens: University of Hull coll. nos. HU.1.C.29.49 (♀ LV: Pl. 5, 114, fig. 1), HU.1.C.29.28 (♂ LV: Pl. 5, 114, fig. 2), HU.1.C.29.75 (♀ RV: Pl. 5, 116, fig. 1), HU.1.C.29.60 (♂ RV: Pl. 5, 116, fig. 2). All the figured specimens are from Bed D2E, 1ft 6in above the base, Coastal section, Speeton Clay, Speeton, E Yorkshire, England; lat. 54° 10'N, long. 0° 14'40"W, Valanginian, Lower Cretaceous.

Diagnosis: Species of *Schuleridea* with valves very high in proportion to length, strongly pitted and truncated postero-dorsally.

Remarks: Papers on the congeneric *S. lamplughii* Neale, 1962 and *S. juddi* Neale, 1962 are also to be found in the *Stereo-Atlas of Ostracod Shells* (105 - 108, 109 - 112, 1978 respectively).

Distribution: In Britain and Germany this species has not been found outside Valanginian deposits where it is associated typically with *Protocythere hannoverana*. In the Danish Embayment it also occurs in the Valanginian but, in addition, Christensen (1973) has recorded it in typically Berriasian faunas from that area.

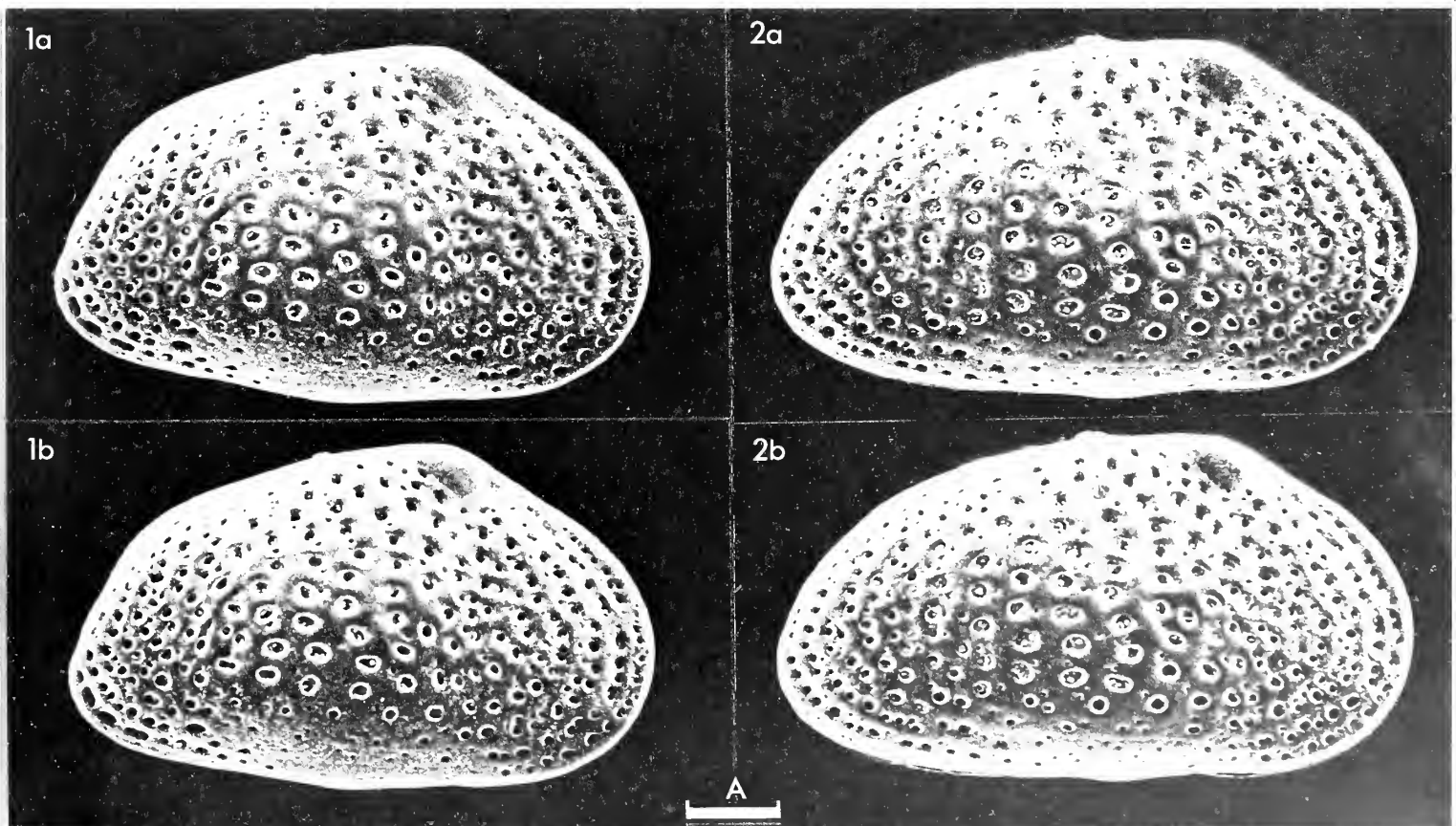
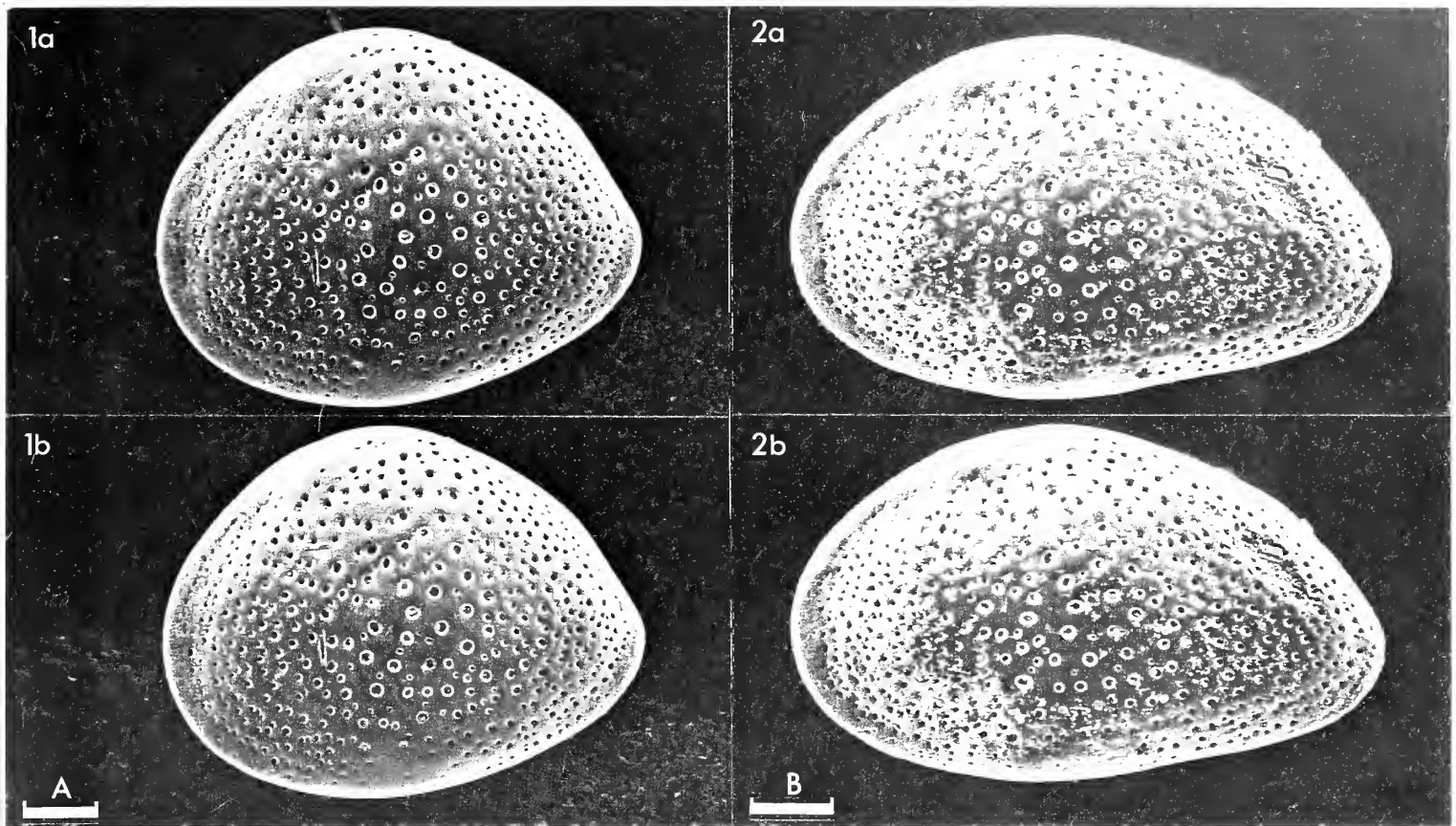
Babinot *et al.* (*Annls Univ. Provence Sci.* **46**, 191 *et al.*, 1971) have recorded *S. praethoerenensis*, *S. cf. praethoerenensis* and *S. gr. praethoerenensis* (not figured) from a number of Upper Berriasian/Lower Valanginian sections in eastern Basse-Provence, SE France, and P. Donze (*in* H. Löffler & D. Danielopol (Eds.), *Aspects of Ecology and Zoogeography of Recent and Fossil Ostracoda*, Proc. Sixth Int. Symp. Ostracoda, 445, 1977, The Hague) lists *S. aff. praethoerenensis* as one of the common species in the Berriasian neritic facies of the Iberian peninsula and Vocontian Basin. P. Ascoli (*Maritime Sediments Spec. Publ.* **1**, 699 *et al.*, pl. 8, fig. 9, 1976) has found a closely comparable form, noted as *S. aff. praethoerenensis*, in Berriasian/Valanginian deposits of the Scotia Shelf, Atlantic Canada. This form also appears to occur in the underlying Tithonian (*ibid.*, 702).

Acknowledgement: Dr. H. Bartenstein is thanked for his kindness in supplying information relating to the type specimen and type locality.

Explanation of Plate 5, 116

Fig. 1, ♀ RV, ext. lat. (HU.1.C.29.75, 688 µm long); fig. 2, ♂ RV, ext. lat. (HU.1.C.29.60, 752 µm long).

Scale A (100 µm; x 120), figs. 1, 2.



ON *PHALCOCY THERE HORRESCENS* (BOSQUET)

by Qadeer A. Siddiqui
(Saint Mary's University, Halifax, Canada)

Genus *PHALCOCY THERE* Siddiqui, 1971

Type-species: (by original designation): *Cythere horrescens* Bosquet 1852.

Diagnosis: A genus of the family Trachyleberididae with a ventral ridge; shell surface reticulate with or without conjunctive spines and/or papillae; mostly with a well-marked posterodorsal process.

Remarks: So far known from the Eocene of Belgium and France (Keij 1957); the Palaeocene and Eocene of Pakistan (Siddiqui 1971); the Palaeocene of Saudi Arabia (Al-Furaih 1976, unpublished Ph.D. thesis, University of Leicester, England); the Eocene and Oligocene of Tanzania (Siddiqui 1971, Ahmad 1977, unpublished Ph. D. thesis, University of Hull, England) and (?) the Palaeocene of the continental shelf off Natal, South Africa (Dingle 1976, *Trans. roy. S. Afr.* Part 1, 35 - 39).

Explanation of Plate 5, 118

Fig. 1, LV, ext. lat. (Io 4253, 600 μ m long); fig. 2, RV, ext. lat. (Io 4256, 630 μ m long); fig. 3, RV, ext. lat., detail of ornament, (Io 4256).

Scale A (200 μ m; x 102), figs. 1, 2; scale B (25 μ m; x 466), fig. 3.

1852 *Cythere horrescens* sp. nov. J. Bosquet, *Mém. cour. Sav. étr. Acad. r. Sci. Belg.* 24, 119, pl. 6, fig. 5.

1852 *Cythere thierensiana* sp. nov. J. Bosquet, *ibid*, 98, (pars).

1852 *Cythere nebulosa* sp. nov. J. Bosquet, *ibid*, 105, pl. 5, fig. 8.

1955 *Trachyleberis horrescens* (Bosquet); V. Apostolescu, *Cahiers géol.*, Paris, nos. 28/29, 272, pl. 8, figs. 125 - 126.

1957 *Hirsutocythere horrescens* (Bosquet); A.J. Keij, *Inst. roy. Sci. Nat. Belg., Mém.* 136, 101, pl. 15, fig. 4, pl. 17, figs. 6 - 7.

1971 *Phalcoocythere horrescens* (Bosquet); Q.A. Siddiqui, *Bull. Br. Mus. nat. Hist. (Geol.) Suppl.* 9, 57, pl. 29, fig. 5; pl. 30, figs. 1 - 6; pl. 33, figs. 12 - 13.

Lectotype: Bosquet Collection, 74b, RV, Royal Belgian Institute of Natural Sciences, Brussels.

Type locality: Grignon, Paris Basin, Lutetian.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. Io 4253 (LV: Pl. 5, 118, fig. 1), Io 4256 (RV: Pl. 5, 118, figs. 2, 3), Io 4255 (RV: Pl. 5, 120, fig. 1), Io 5507 (LV: Pl. 5, 120, figs. 2, 3), Io 4253 and Io 4255 both from an abandoned quarry in the grounds of the Ecole Agriculture at Grignon, Paris Basin, France, approx. lat. 48° 45'N, long. 2° 28'E; Lutetian IV, yellow and white calcareous, fossiliferous sands, approx. 7m in thickness; coll. A.J. Keij. Io 4256 and Io 5507 both from Villiers-St.-Frédéric, Paris Basin, France, approx. lat. 48° 50'N, long. 1° 50'E; Lutetian; coll. by N. Grékoff.

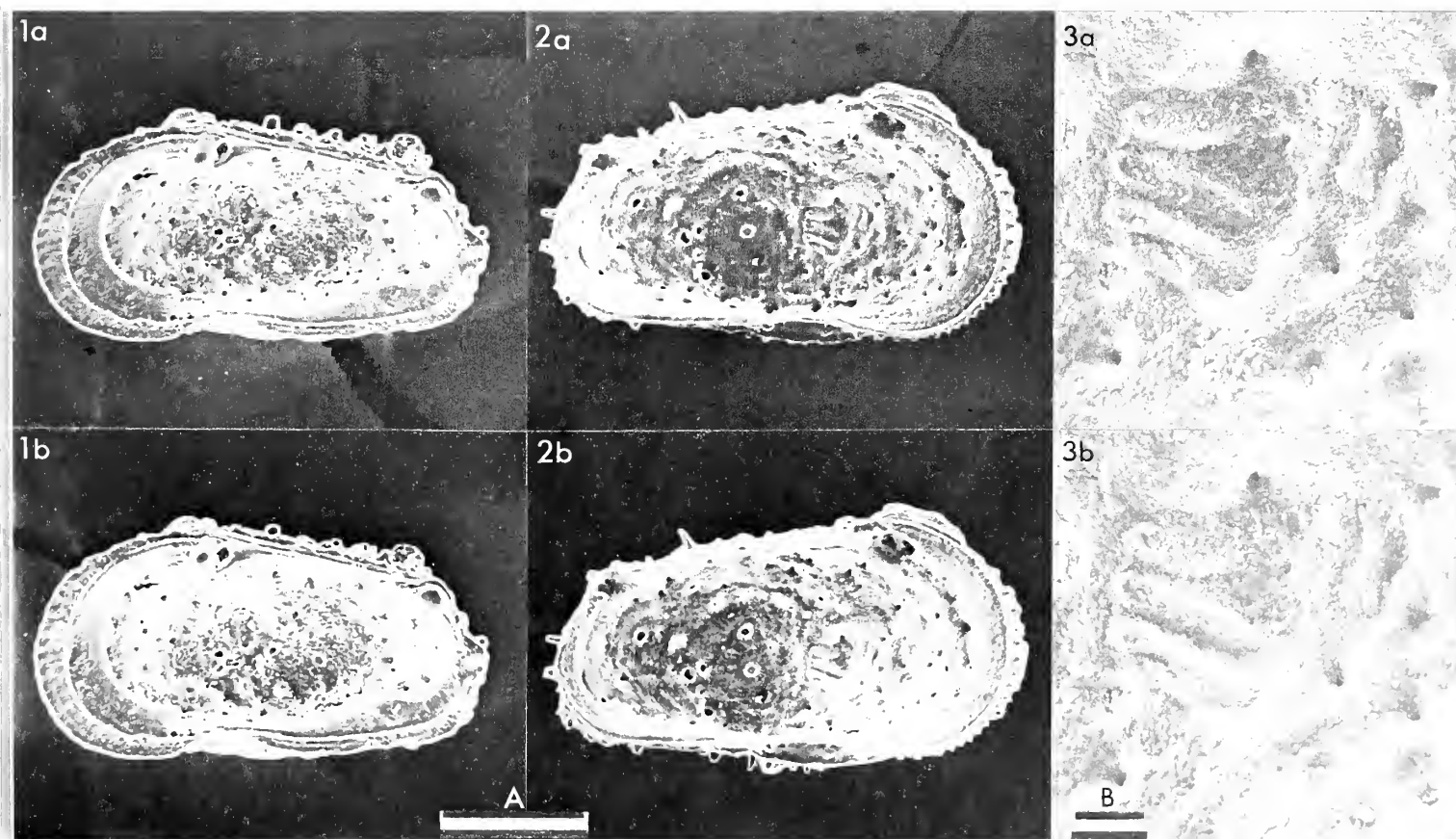
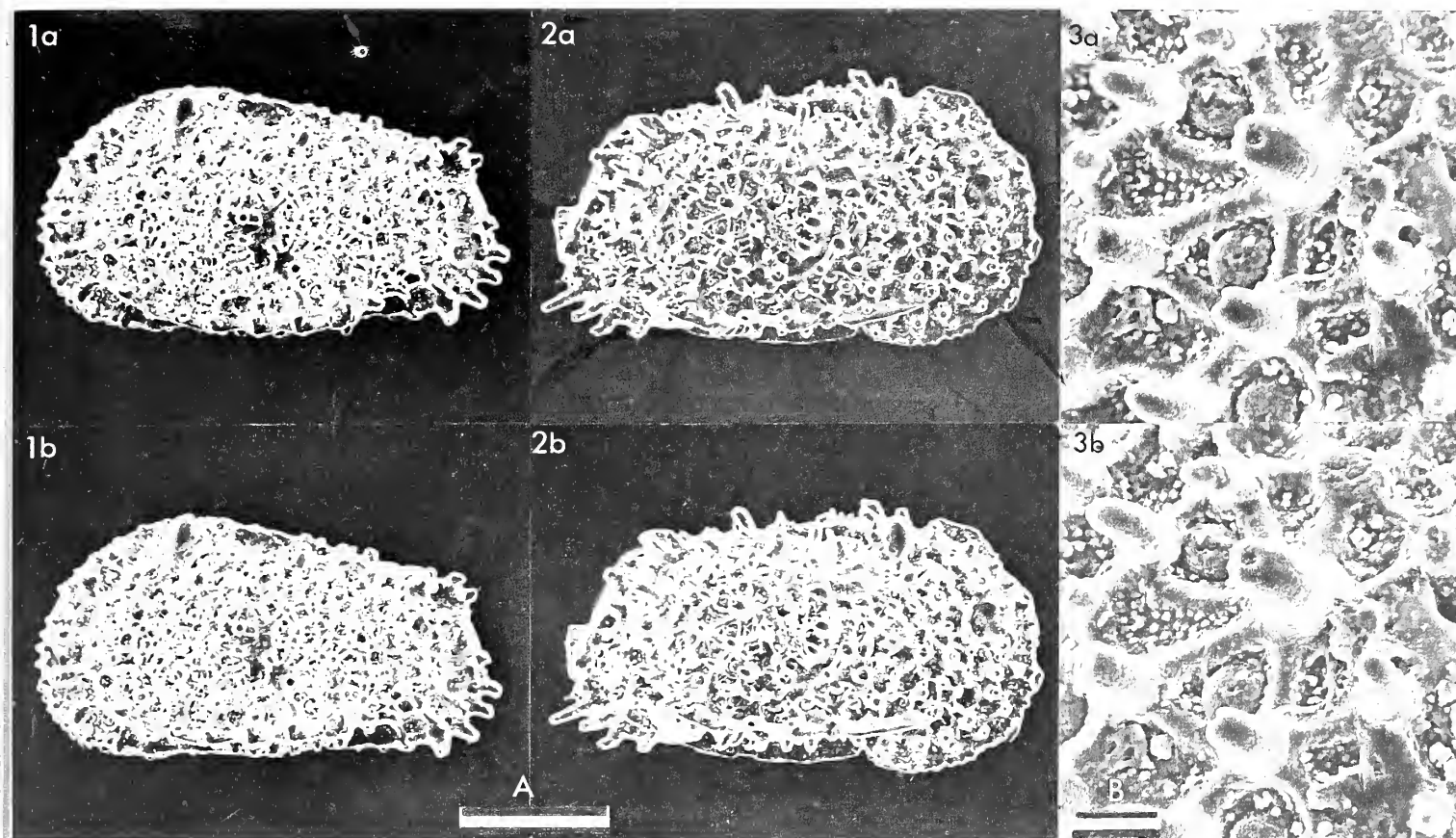
Diagnosis: Species of *Phalcoocythere* with well-marked ventral ridge and posterodorsal process; posteroventral margin ornamented with five or six large spines.

Remarks: Keij (1957, 102, pl. 15, fig. 4) observed two round closely set frontal scars in his material. A left valve from the Lutetian of Villiers-St.-Frédéric, Paris Basin, photographed herein (Pl. 5, 120, figs. 2, 3) shows a single sigmoid frontal scar formed by the fusion of the two discrete scars shown by Keij plus the addition of a third rounded scar at the top.

Distribution: Belgium (Lutetian and Ledian), France (Upper Ypresian, Lutetian and Ledian). For details on the distribution see Keij, 1957, 101.

Explanation of Plate 5, 120

Fig. 1, RV, int. lat. (Io 4255, 590 μ m long); fig. 2, LV, int. lat. (Io 5507, 622 μ m long); fig. 3, LV, int. mus. sc. (Io 5507).
Scale A (200 μ m; x 102), figs. 1, 2; scale B (25 μ m; x 436), fig. 3.



ON *CYAMOCYTHERIDEA CONTRACTA* DORUK sp. nov.

by Neriman Doruk
(Ege University, Izmir, Turkey)

Cyamocytheridea contracta sp. nov.

Holotype: Brit. Mus. (Nat. Hist.) Io 4785; ♂ RV.

Type locality: Road cutting about 2km SW of Com, Turkey, approx. lat. 32°02'N, long. 36°12'E; yellow sandstone with abundant molluscan shell fragments and foraminifera, shallow marine, presumed littoral, Upper Tortonian.

Derivation of name: Latin, meaning contracted, referring to main pore of sieve plate in the normal pore canals.

Explanation of Plate 5, 122

Fig. 1, ♂ RV, ext. lat. (holotype, Io 4785, 670 µm long); figs. 2, 3, 4, ♀ LV (Io 4786, 660 µm long): fig. 2, ext. lat.; fig. 3, detailed view of normal pores and ornament; fig. 4, detailed view of one pore.
Scale A (500 µm; x 102), fig. 1; scale B (500 µm; x 99), fig. 2; scale C (20 µm; x 900), fig. 3; scale D (5 µm; x 3500), fig. 4.

Figured specimens: Brit. Mus. (Nat. Hist.) specimens: Io 4785 (holotype, ♂ RV: Pl. 5, 122, fig. 1); Io 4786 (♀ LV: Pl. 5, 122, figs. 2, 3, 4); Io 4787 (♀ LV: Pl. 5, 124, fig. 1); Io 4788 (♀ RV: Pl. 5, 124, figs. 2, 3). Io 4785 and Io 4786 are from the type locality. Io 4787 is from the base of the section, 1km SW of Babatorun, Turkey, approx. lat. 36°05'N, long. 36°13'E, Tortonian (lithology and ecology as at type locality). Io 4788 is from 1km NW of Yolagzi, Turkey, approx. lat. 36°04'N, long. 36°14'E, Tortonian.

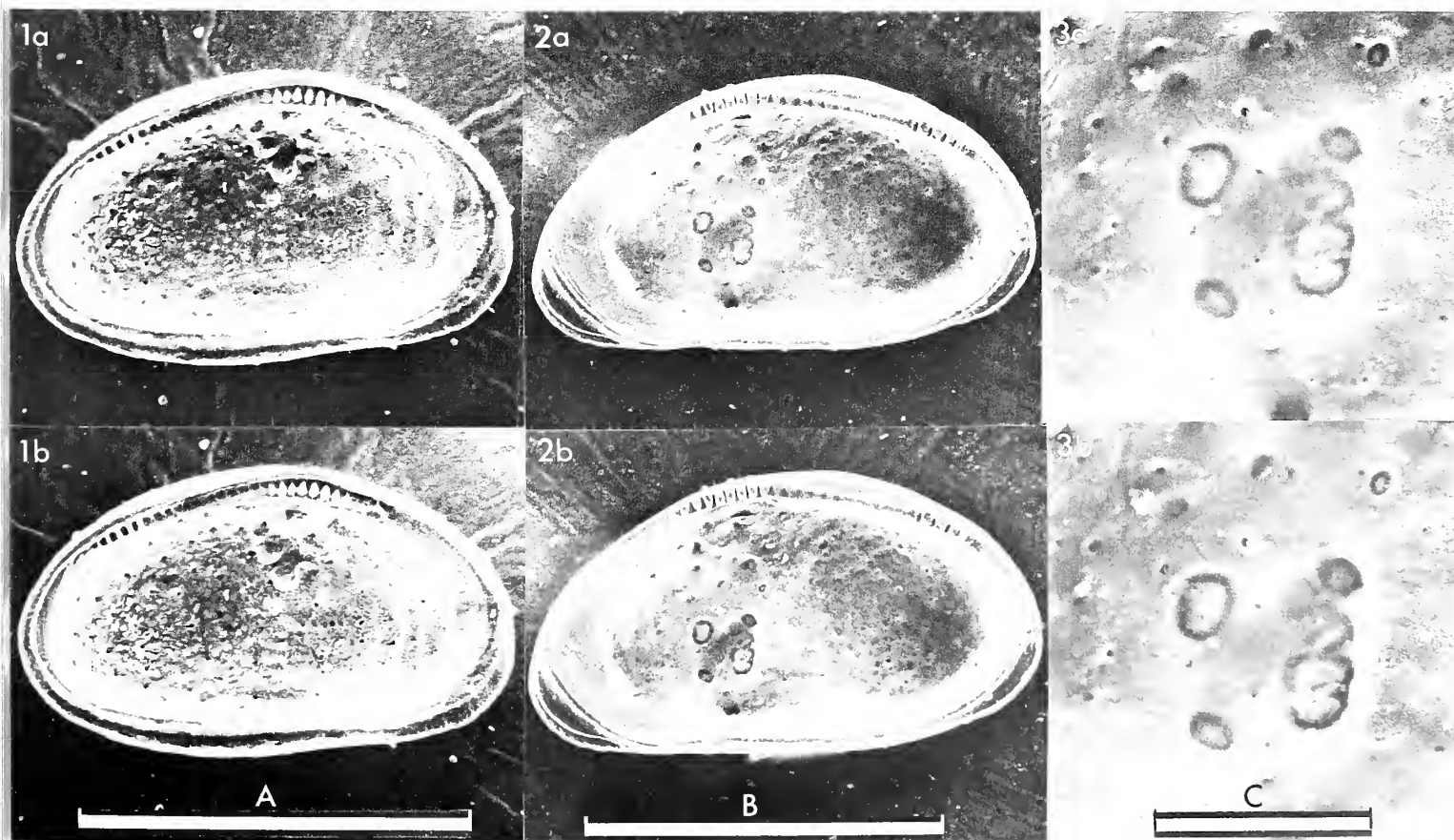
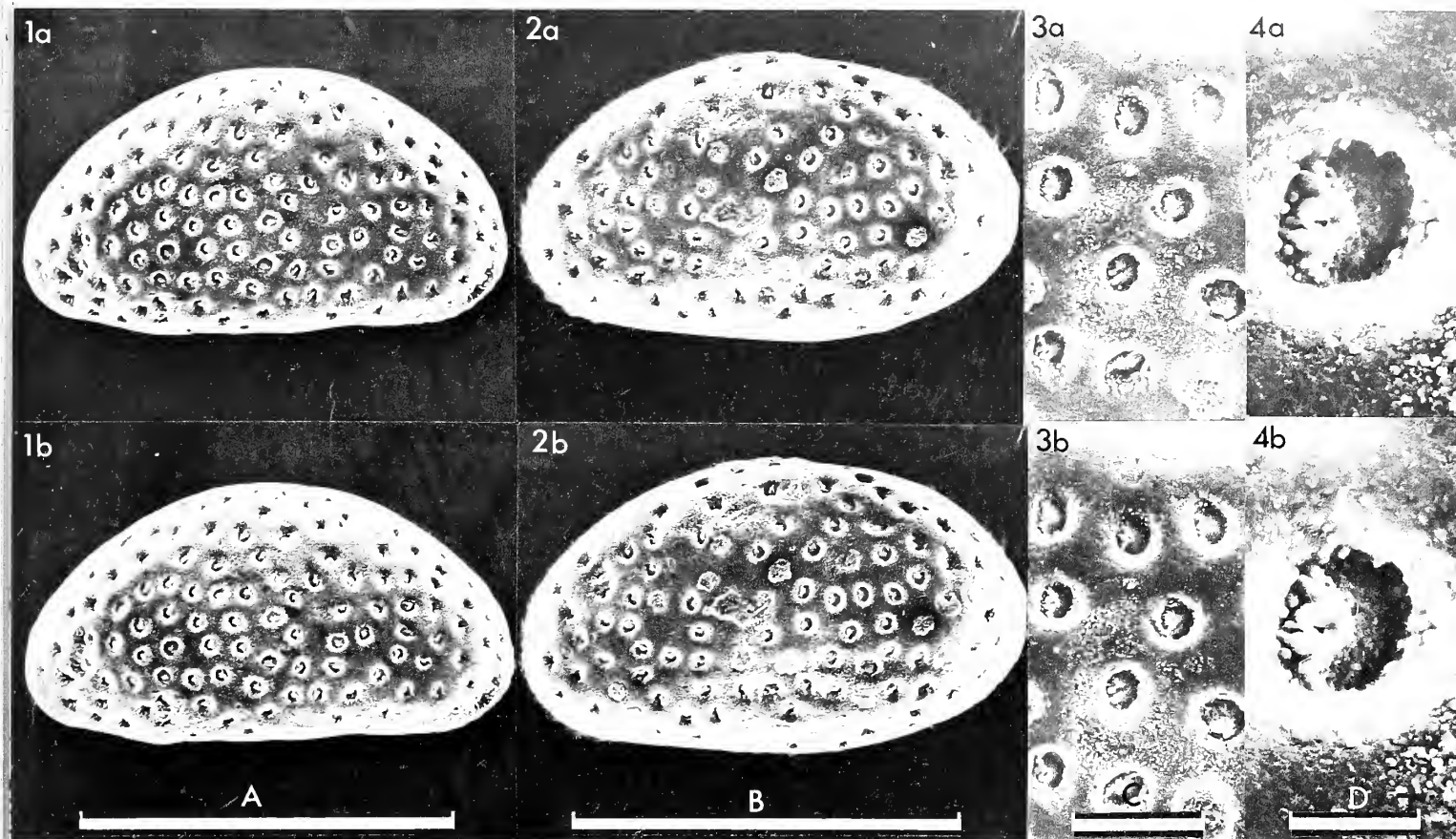
Diagnosis: Carapace egg-shaped, shell surface covered with abundant large deep circular pits in which normal pore canals contain sieve-plates. Main pore is surrounded by a protrusion.

Remarks: Width of vestibule and marginal area, and size of fossae may be smaller than in the specimens figured.

Distribution: *C. contracta* has been found in the Tortonian at several localities in the Antakya region, Turkey.

Explanation of Plate 5, 124

Fig. 1, ♀ LV, int. lat. (Io 4787, 640 µm long); figs. 2, 3, ♀ RV (Io 4788, 710 µm long): fig. 2, int. lat.; fig. 3, muscle scars.
Scale A (500 µm; x 108), fig. 1; scale B (500 µm; x 100), fig. 2; scale C (100 µm; x 295), fig. 3.



ON *CYAMOCYTHERIDEA MENISCUS* DORUK sp. nov.

by Neriman Doruk
(Ege University, Izmir, Turkey)

Cyamocytheridea meniscus sp. nov.

Holotype: Brit. Mus. (Nat. Hist.) Io 4778, ♂ RV.

Type locality: Erosional stream cutting 1km S of Sarılı, Antakya, Turkey, approx. lat. 36° 06'N, long. 36° 07'E, bioclastic limestone with molluscan shells, presumed shallow marine, Tortonian.

Derivation of name: Latin, meaning "crescent", referring to the shape of the normal pore canals.

Explanation of Plate 5, 126

Fig. 1, ♂ RV, ext. lat. (holotype, Io 4778, 820 µm long); fig. 2, ♀ LV, ext. lat. Io 4779, 850 µm long).
Scale A (500 µm; x 101), fig. 1; scale B (500 µm; x 104), fig. 2.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. Io 4778 (holotype, ♂ RV: Pl. 5, 126, fig. 1; Pl. 5, 128, figs. 2, 3); Io 4779 (♀ LV: Pl. 5, 126, fig. 2; Pl. 5, 128, fig. 1). Both specimens are from the type level and locality at the base of the section.

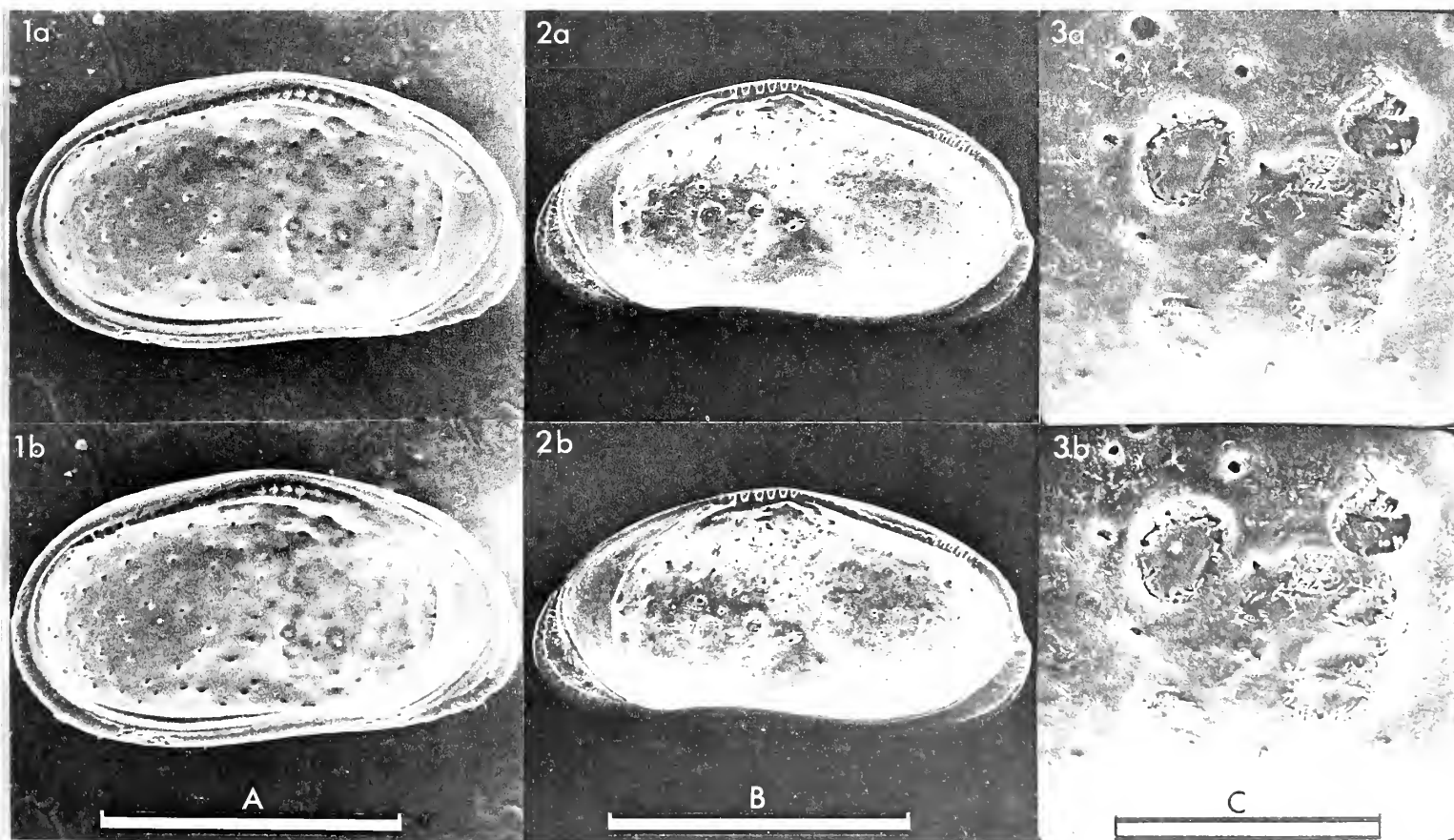
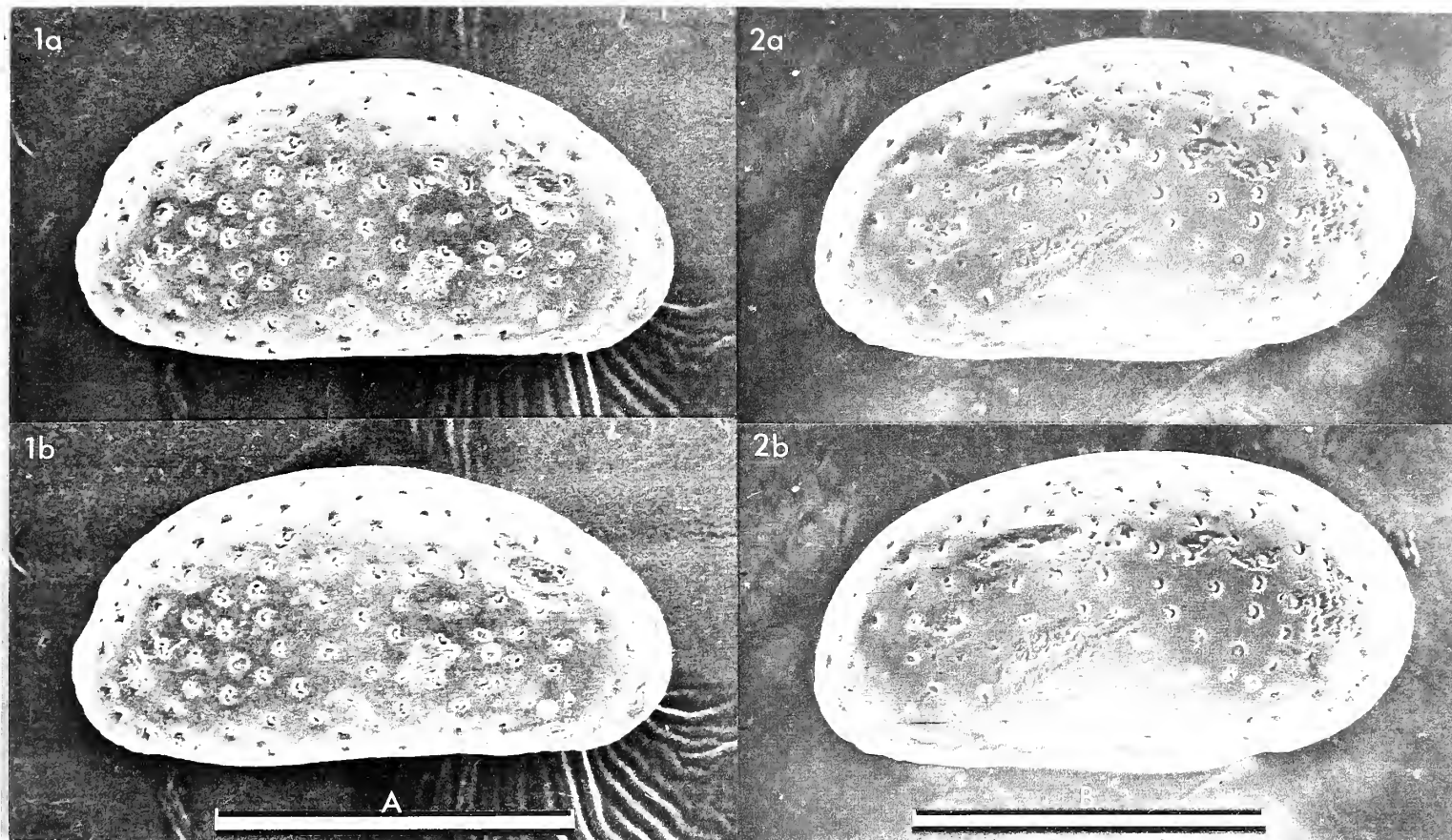
Diagnosis: Carapace elongate. Normal pore canals crescent-shaped.

Remarks: Size is variable. Males are considerably more elongate than females (see Pl. 5, 126, fig. 1).

Distribution: This specimen has so far only been found at the base of the section in the type locality.

Explanation of Plate 5, 128

Fig. 1, ♀ LV, int. lat. (Io 4779); figs. 2, 3, ♂ RV, (holotype, Io 4778); fig. 2, int. lat.; fig. 3, musc. sc.
Scale A (500 µm; x 88), fig. 1; scale B (500 µm; x 86), fig. 2; scale C (100 µm; x 360), fig. 3.



ON *CYAMOCYTHERIDEA OBSTIPA* DORUK sp. nov.

by Neriman Doruk
(Ege University, Izmir, Turkey)

Cyamocytheridea obstipa sp. nov.

Holotype: Brit. Mus. (Nat. Hist.) Io 4780, ♂ RV.

Type locality: Stream cutting, 1km S of Sarılı, Antakya, Turkey, approx. lat. 36° 06'N, long. 36° 07'E; bioclastic limestone with molluscan fragments, presumed shallow marine, Tortonian.

Derivation of name: Latin, meaning "inclined obliquely", referring to the sieve plates of the normal pore canals.

Diagnosis: Carapace subrectangular with slightly convex dorsal margin; anterior and posterior ends short, broadly rounded. Normal pore canals with conical, obliquely inclined sieve plates. Female more tumid than male.

Explanation of Plate 5, 130

Fig. 1, ♂ RV, ext. lat. (holotype, Io 4780, 700 µm long); figs. 2, 3, ♀ LV (Io 4781, 800 µm long); fig. 2, ext. lat.; fig. 3, detailed view of normal pores and surface.

Scale A (500 µm; x 102), fig. 1; scale B (500 µm; x 86), fig. 2; scale C (50 µm; x 510), fig. 3.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. Io 4780 (holotype, ♂ RV: Pl. 5, 130, fig. 1; Pl. 5, 132, fig. 2); Io 4781 (♀ LV: Pl. 5, 130, figs. 2, 3; Pl. 5, 132, figs. 1, 3). Both specimens are from the type locality, 2m above the base of the section.

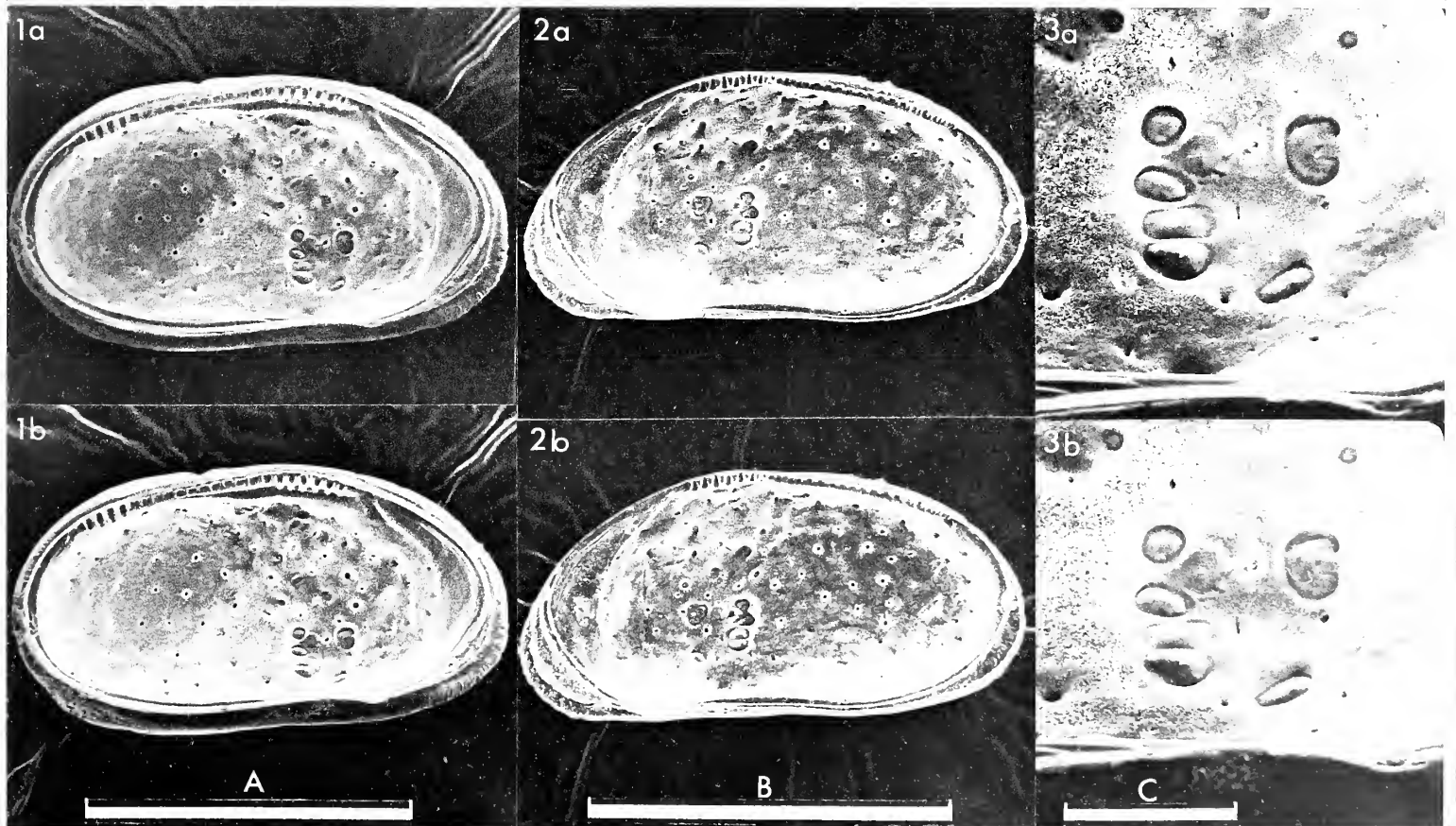
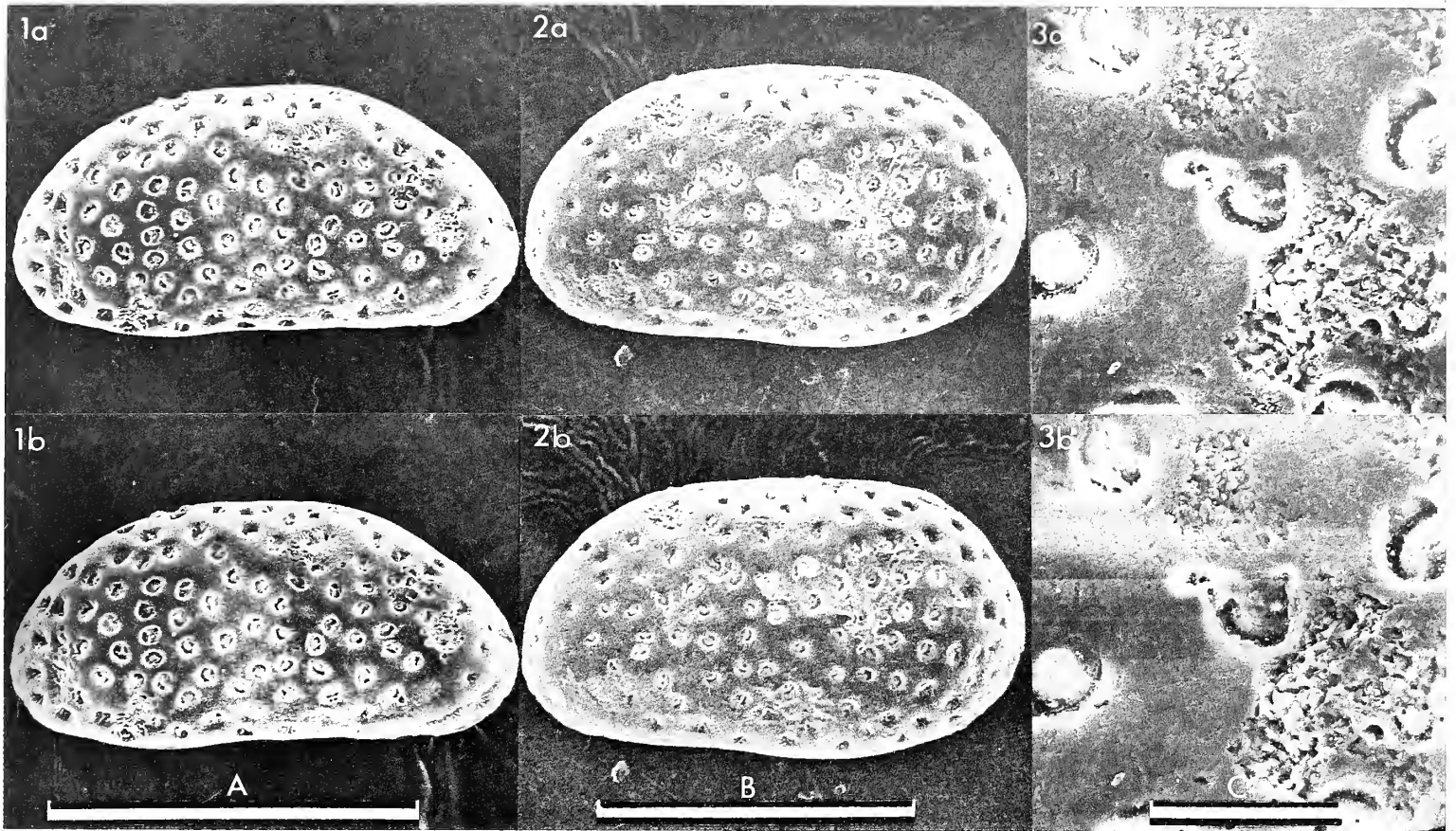
Remarks: *C. obstipa* sp. nov. differs from *C. polygona* Doruk (*Stereo-Atlas of Ostracod Shells*, 1978, 5, 133 - 136) and *C. meniscus* Doruk (*Stereo-Atlas of Ostracod Shells*, 1978, 5, 125 - 128, 1978) by the large size of the fossae producing an almost reticulate ornamentation. Further, the quadrate posterior outline of *C. obstipa* contrasts with the narrowly rounded posterior and obliquely angled posterodorsal slope of *C. polygona*. The short, broadly rounded anterior end of *C. obstipa* differs from the elongate anterior of *C. meniscus* which has the anterior cardinal angle set well back on the carapace, almost as far back, but not quite, as the valve centre.

Distribution: This species has so far only been found in the type locality.

Explanation of Plate 5, 132

Figs. 1, 3, ♀ LV (Io 4781): fig. 1, int. lat.; fig. 3, musc. sc.; fig. 2, ♂ RV, int. lat. (holotype, Io 4780).

Scale A (500 µm; x 88), fig. 1; scale B (500 µm; x 100), fig. 2; scale C (100 µm; x 230), fig. 3.



ON *CYAMOCYTHERIDEA POLYGONA* DORUK sp. nov.

by Neriman Doruk
(Ege University, Izmir, Turkey)

Cyamocytheridea polygona sp. nov.

Holotype: Brit. Mus. (Nat. Hist.) Io 4775; ♀ LV.

Type locality: Road cutting 5km E of Salbaş, Turkey, approx. lat. 37° 09'N, long. 35° 10'E; grey marl with abundant foraminifera and molluscan fragments, presumed shallow marine, Tortonian.

Derivation of name: Greek, polygonal, referring to shape of normal pore canals.

Figured specimens: Brit. Mus. (Nat. Hist.) specimens: Io 4774 (♂ RV; Pl. 5, 134, fig. 1); Io 4775 (holotype, ♀ LV; Pl. 5, 134, figs. 2, 3; Pl. 5, 136, fig. 1); Io 4776 (♀ RV; Pl. 5, 136, figs. 2, 3). Io 4774 and Io 4775 are from the base and 2m above the base respectively of the type section. Io 4776 is from a road cutting 2km S of Salbaş, Turkey, approx. lat. 37° 09'N, long. 35° 07'E, Tortonian (top of section, same lithology and ecology as at type locality).

Explanation of Plate 5, 134

Fig. 1, ♂ RV, ext. lat. (Io 4774, 680 µm long); figs. 2, 3, ♀ LV (holotype, Io 4775, 680 µm long): fig. 2, ext. lat.; fig. 3, detailed view of normal pore canal.

Scale A (250 µm; x 108), fig. 1; scale B (250 µm; x 112), fig. 2; scale C (10 µm; x 1265), fig. 3.

Diagnosis: Carapace with highest part of shell anterior of centre; normal pore canals polygonal in shape.

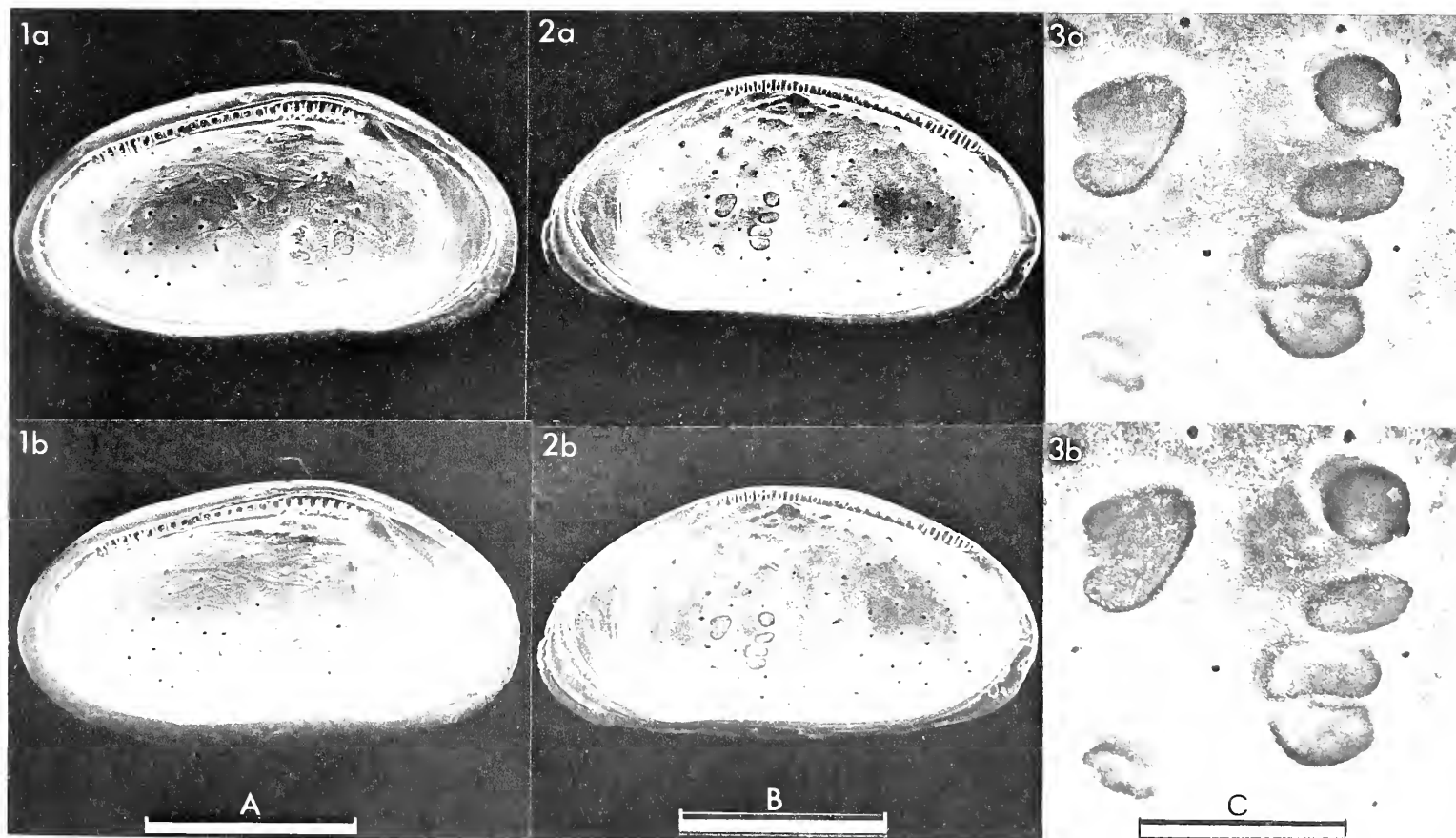
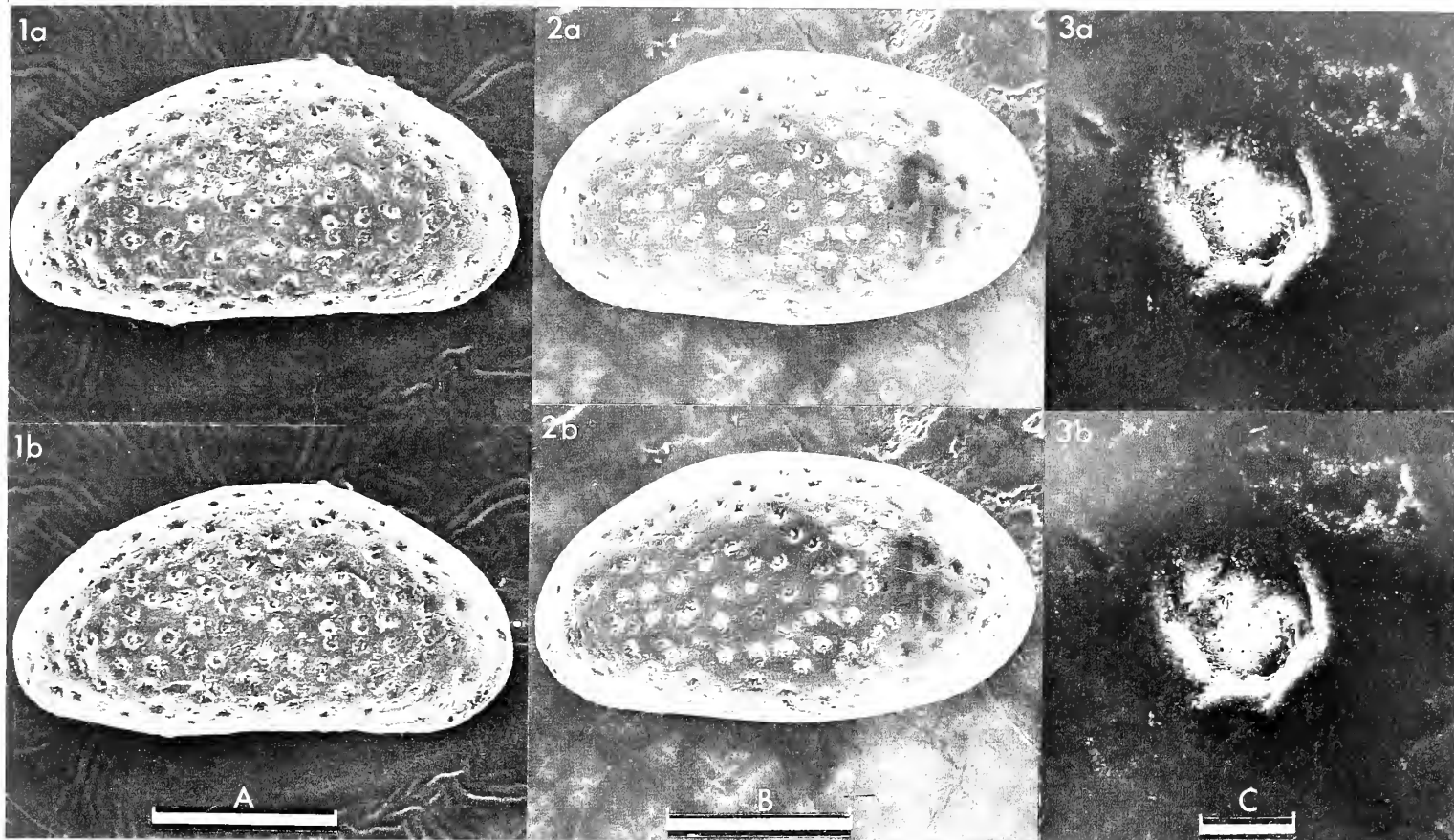
Remarks: Hinge with variable number of teeth: 6 - 10 in anterior element; 4 - 6 in posterior element. Width of vestibule variable. Size variable. Female more tumid than male posteriorly (see Pl. 5, 134, fig. 2).

Distribution: This species occurs in the Adana and Tarsus regions of Turkey, Tortonian.

Explanation of Plate 5, 136

Fig. 1, ♀ LV, int. lat. (holotype, Io 4775); figs. 2, 3, ♀ RV, (Io 4776, 600 µm long): fig. 2 int. lat.; fig. 3, musc. sc.

Scale A (250 µm; x 102), fig. 1; scale B (250 µm; x 112), fig. 2; scale C (50 µm; x 570), fig. 3.



ON *ROCKALLIA ENIGMATICA*
WHATLEY, FRAME AND WHITTAKER gen. et sp. nov.

by Robin Whatley¹, Paul Frame² & John E. Whittaker³
(University College of Wales, Aberystwyth¹, Robertson Research
International Ltd.², British Museum [Natural History], London³)

Genus *ROCKALLIA* gen. nov.

Type-species : *Rockallia enigmatica* sp. nov.

Derivation of name: From the occurrence and apparent restriction of the type species to Holocene and Recent sediments in the Rockall Trough.

Diagnosis: Subrectangular. Both end margins rounded in left valve. In right valve anterior rounded but posterior bluntly pointed with apex just below mid-height. Dorsal margin straight in female, slightly concave medianly in male. Ventral margin gently biconvex in left valve; acuminate in posterior third in right valve. Left valve slightly larger than right with overlap at the cardinal angles and mid-ventrally. Coarsely reticulate. Vertical element of ribs forming the reticulæ dominant and radiating from mid-dorsal position. Normal pore canals open, few and situated on the ribs. Inner lamella narrow with small vestibulæ at each end. Selvage strong, sub-peripheral. Hinge lophodont. Four vertically disposed adductor scars, all in contact situated below the mid-point of the hinge margin; single reniform frontal scar.

Explanation of Plate 5, 138

Fig. 1, ♀ LV, ext. lat. (paratype, OS 7603, 570 µm long); fig. 2, ♀ RV, ext. lat. (holotype, OS 7599, 590 µm long); fig. 3, ♂ RV, ext. lat. (paratype, OS 7604, 540 µm long).
Scale A (100 µm; x 110), figs. 1 - 3.

Remarks: This new genus is difficult to assign with certainty to any group of Ostracoda. Although some 200 specimens have been encountered to date none have well preserved appendages although some have "mummified" soft parts. The possession of four adductor scars in a vertical line would seem to indicate cytheracean affinities but the situation of these scars in a dorso-median position, the narrow and primitive inner lamella and the shape and outline are suggestive of the Platycopina. The genus is, on these grounds, and in the absence of soft parts, therefore, tentatively referred to the latter suborder despite the fact that the overlap relationship of the valves militates against this.

Rockallia enigmatica sp. nov.

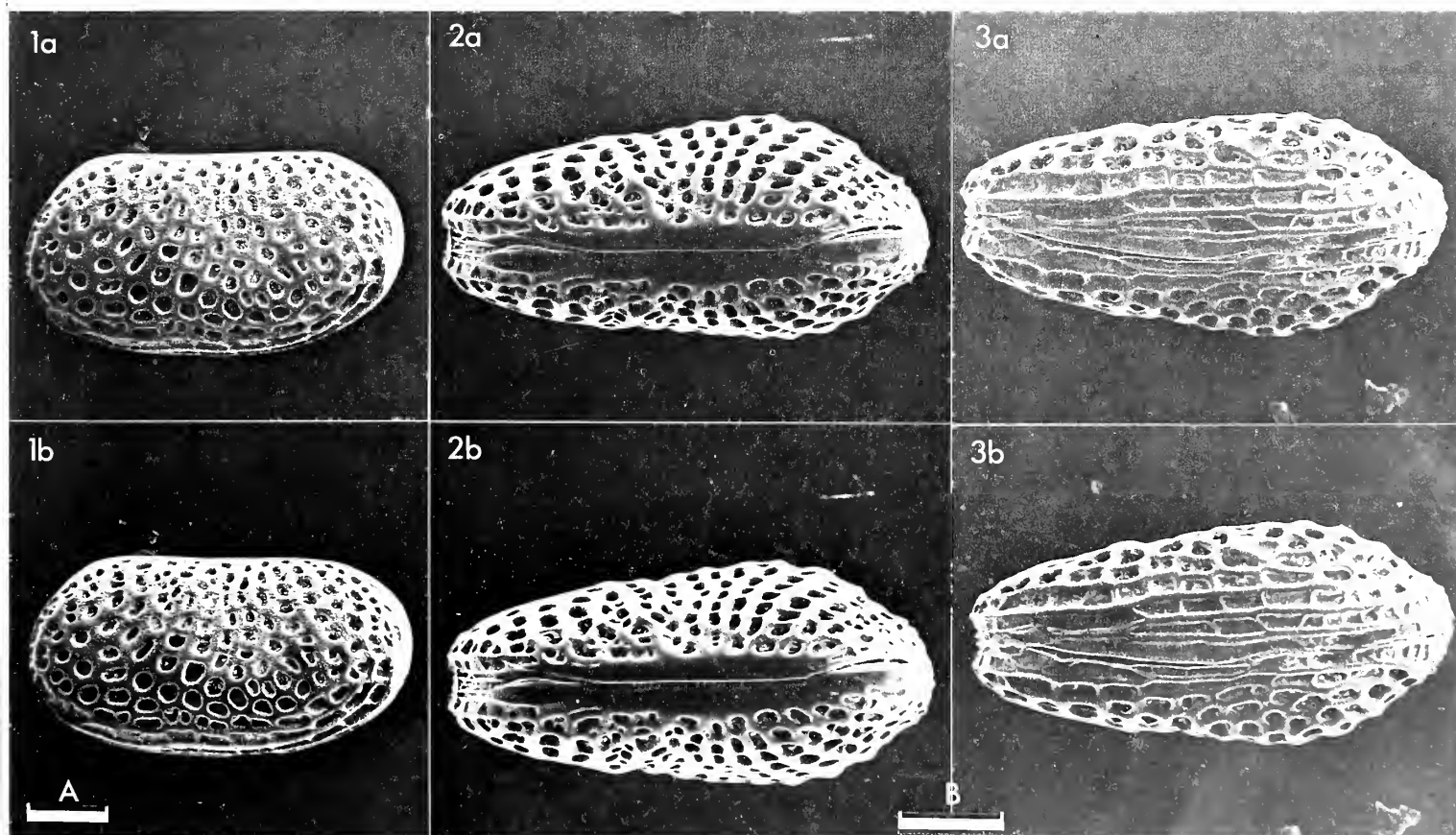
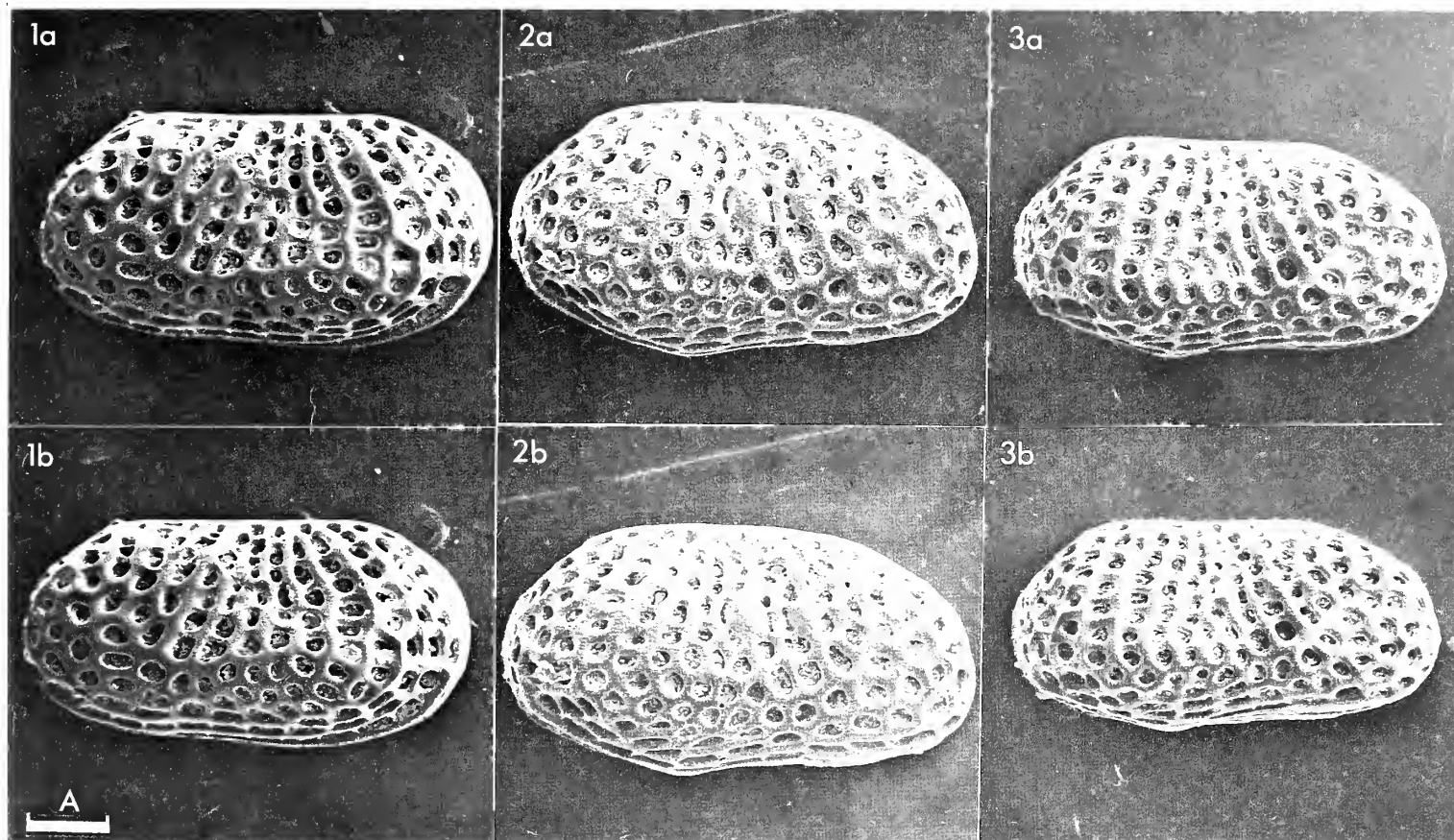
Holotype: Brit. Mus. (Nat. Hist.) OS 7599, ♀ RV.
[Paratypes: Brit. Mus. (Nat. Hist.) OS 7600 - OS 7605].

Type locality: Rockall Trough, lat. 55°02.53'N, long. 12°02.68'W. Recent, marine, *Globigerina* Ooze: depth 2,880m.

Derivation of name: Latin *aenigmaticus*, an enigma: alluding to the perplexing taxonomic status of this species.

Explantion of Plate 5, 140

Fig. 1, juv. -1, LV, ext. lat. (paratype, OS 7600, 480 µm long); figs. 2, 3, juv. -1 car., (paratype, OS 7602, 480 µm long); fig. 2, ext. dors. fig. 3, ext. vent.
Scale A (100 µm; x 110), fig. 1; scale B (100 µm; x 140), figs. 2, 3.



Figured specimens: Brit. Mus. (Nat. Hist.) nos. **OS 7599** (holotype, ♀ RV: Pl. 5, 138, fig. 2), **OS 7600** (juv. -1 LV: Pl. 5, 140, fig. 1), **OS 7602** (juv. -1 car.: Pl. 5, 140, figs. 2, 3), **OS 7603** (♀ LV: Pl. 5, 138, fig. 1; Pl. 5, 142, figs. 1 - 4), **OS 7604** (♂ RV: Pl. 5, 138, fig. 3, Pl. 5, 144, figs. 1 - 4). **OS 7599, OS 7600**; from lat. 55° 02.53'N, long. 12° 02.68'W, 2880m; **OS 7602** from lat. 56° 55.20'N, long. 10° 29.80'W, 2250m; **OS 7603** from lat. 54° 40.95'N, long. 15° 10.89'W, 2,500m; **OS 7604** from lat. 55° 11.29'N, 15° 50.84'W, 2,000m.

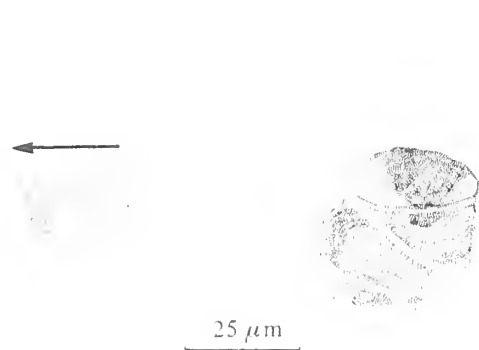
Diagnosis: As for genus.

Remarks: *R. enigmatica* occurs frequently in Holocene and Recent samples from the Rockall Trough ranging in depth from 1,040m to 4,000m. It occurs commonly in association with various species of *Echinocythereis* and *Krithe* and with *Muellerina abyssicola* (Sars) and *Ambocythere caudata* van den Bold.

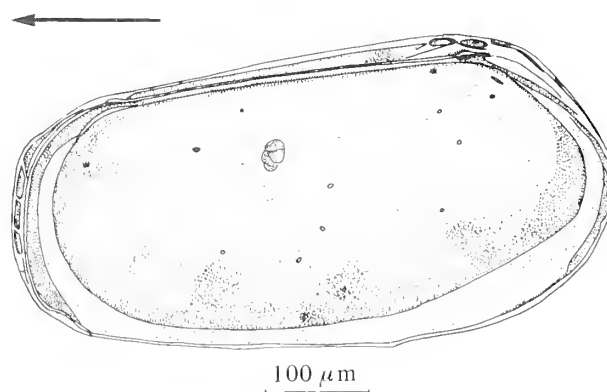
Distribution: The species seems to be confined to the Holocene and Recent deposits of the Rockall Trough area.

Explanation of Plate 5, 142

Figs. 1 - 4, ♀ LV, (paratype, OS 7603, 570 µm long): fig. 1, int. lat.; fig. 2, post. hinge; fig. 3, ant. hinge; fig. 4, musc. sc. Scale A (150 µm; x 90), fig. 1; scale B (50 µm; x 300), figs. 2, 3; scale C (50 µm; x 360), fig. 4.



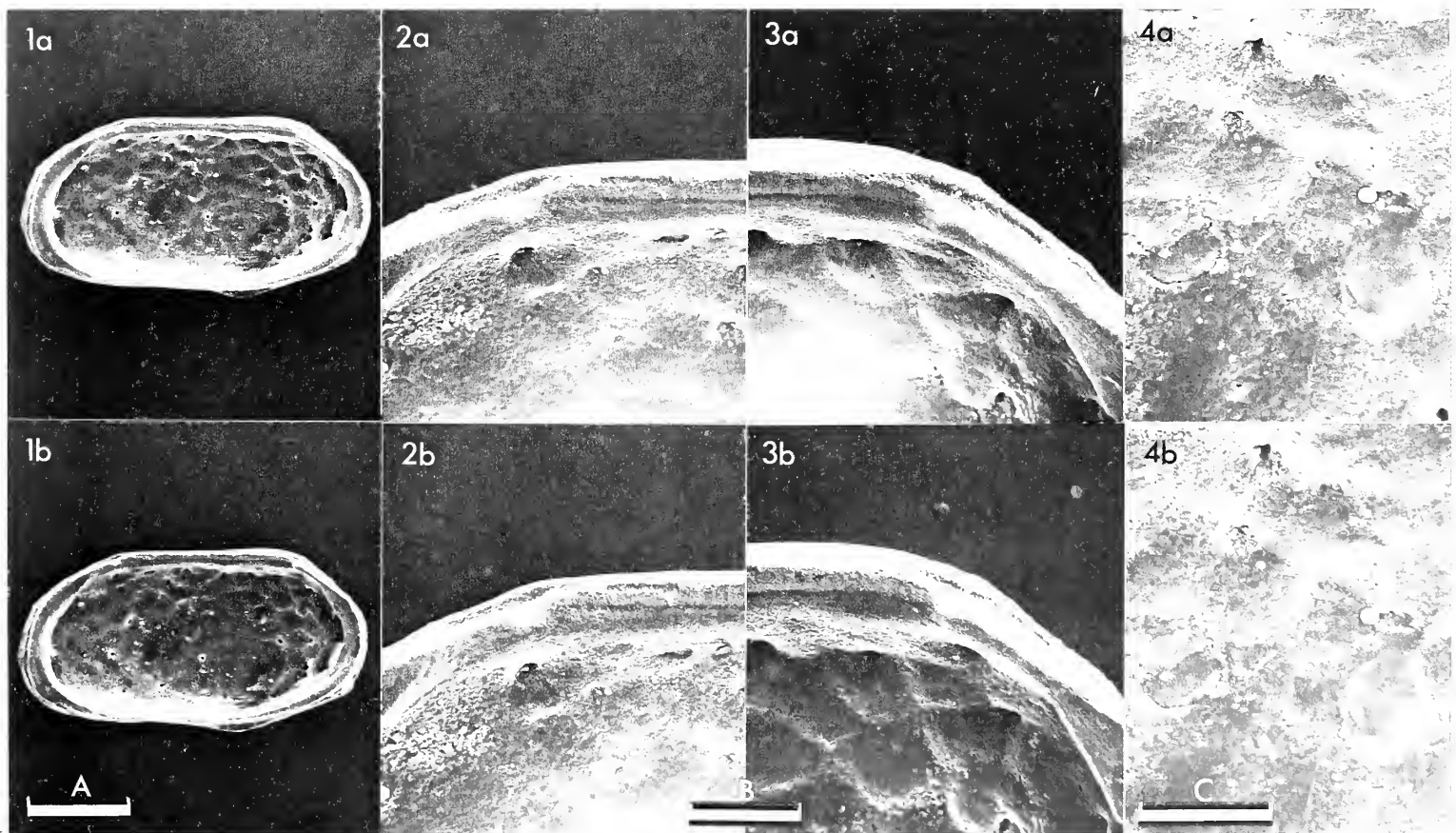
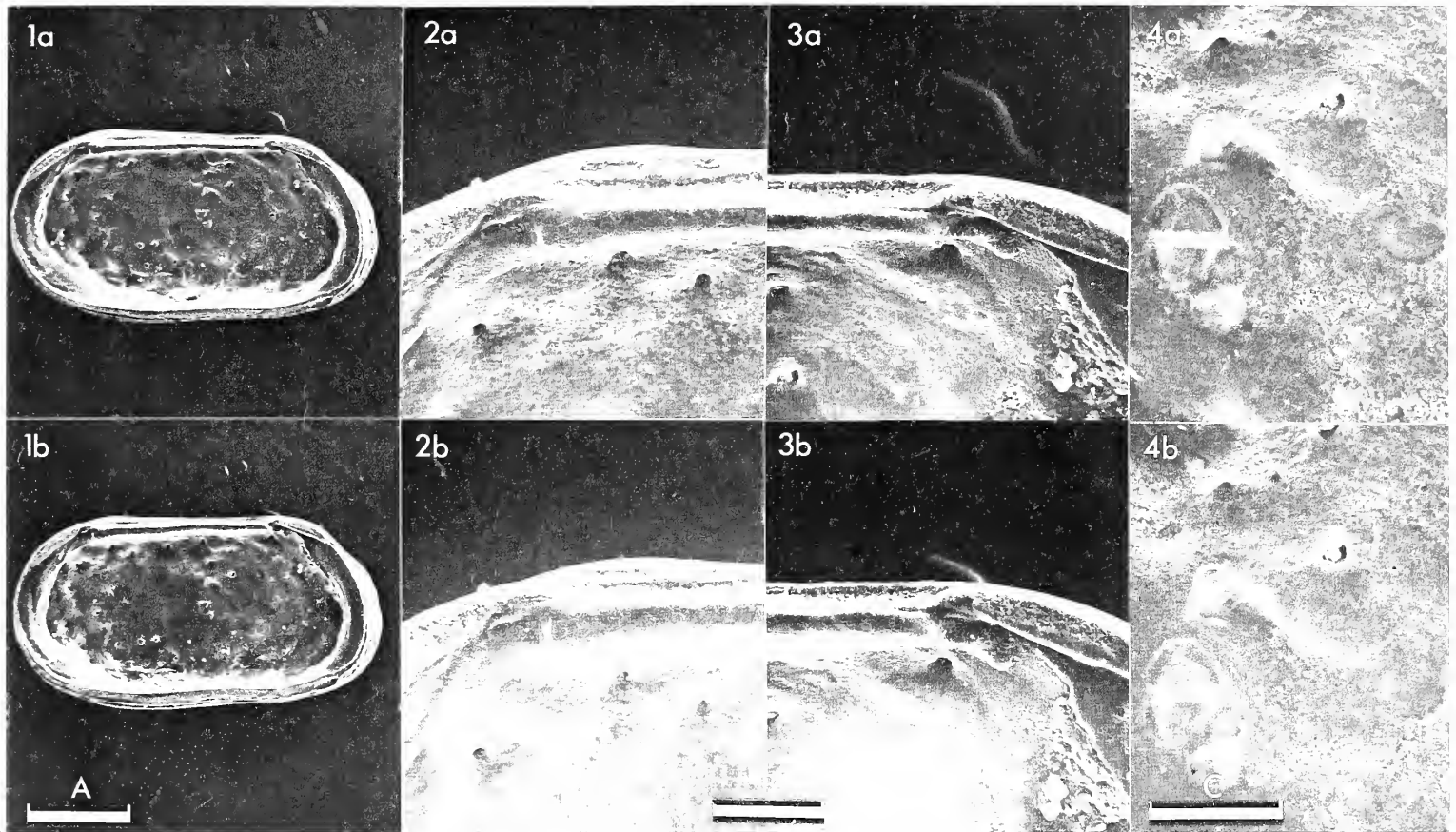
Text-fig. 1. Adductor and frontal muscle scars of ♀ RV. (OS 7599).



Text-fig. 2. Internal view of ♀ LV. (OS 7603).

Explanation of Plate 5, 144

Figs. 1 - 4, ♂ RV, (paratype, OS 7604, 540 µm long): fig. 1, int. lat.; fig. 2, ant. hinge; fig. 3, post. hinge; fig. 4, musc. sc. Scale A (150 µm; x 90), fig. 1; scale B (50 µm; x 300), figs. 2, 3; scale C (50 µm; x 360), fig. 4.



ON *CALLISTOCY THERE MURRAYI* WHITTAKER sp. nov.

by John E. Whittaker

(British Museum [Natural History], London)

Callistocythere murrayi sp. nov.*Holotype*: Brit. Mus. (Nat. Hist.) 1977.45, ♀ car.

[Paratypes: Brit. Mus. (Nat. Hist.) 1977.46 - 56].

Type locality: Mother Siller's Channel (station 135), a tidal creek in Christchurch Harbour, Dorset, S England; approx. lat. 50°43'N, long. 1°45'W. Recent, brackish water.*Derivation of name*: After Professor J.W. Murray, University of Exeter, in honour of his Christchurch Harbour ecological studies.*Diagnosis*: Coarsely reticulate. Pattern of prominent ridges distinctive, particularly the two curved posterior ones which continue into ventral and a dorsal longitudinal ridges, respectively, the latter continuing through the eye-spot to end antero-ventrally; central area of valve with short ridges anastomosing to a further main longitudinal ridge just above mid height. Shape of copulatory appendages distinctive.

Explanation of Plate 5, 146

Fig. 1, ♀ car., ext. lt. lat. (holotype, 1977.45, 500 µm long); fig. 2, ♂ car., ext. lt. lat. (paratype, 1977.46, 490 µm long); fig. 3, juv. (-1) car., ext. lt. lat. (paratype, 1977.47, 420 µm long).

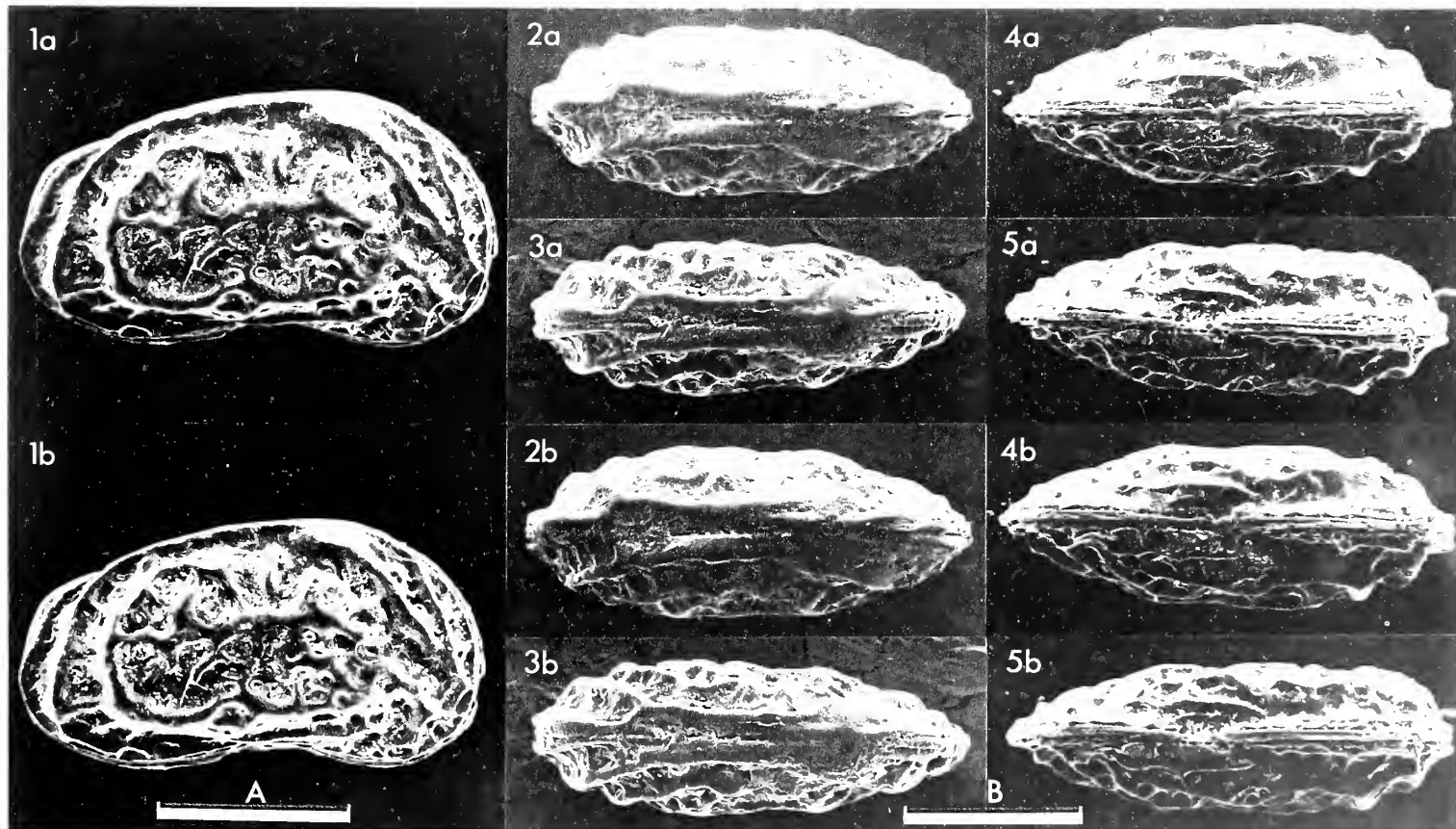
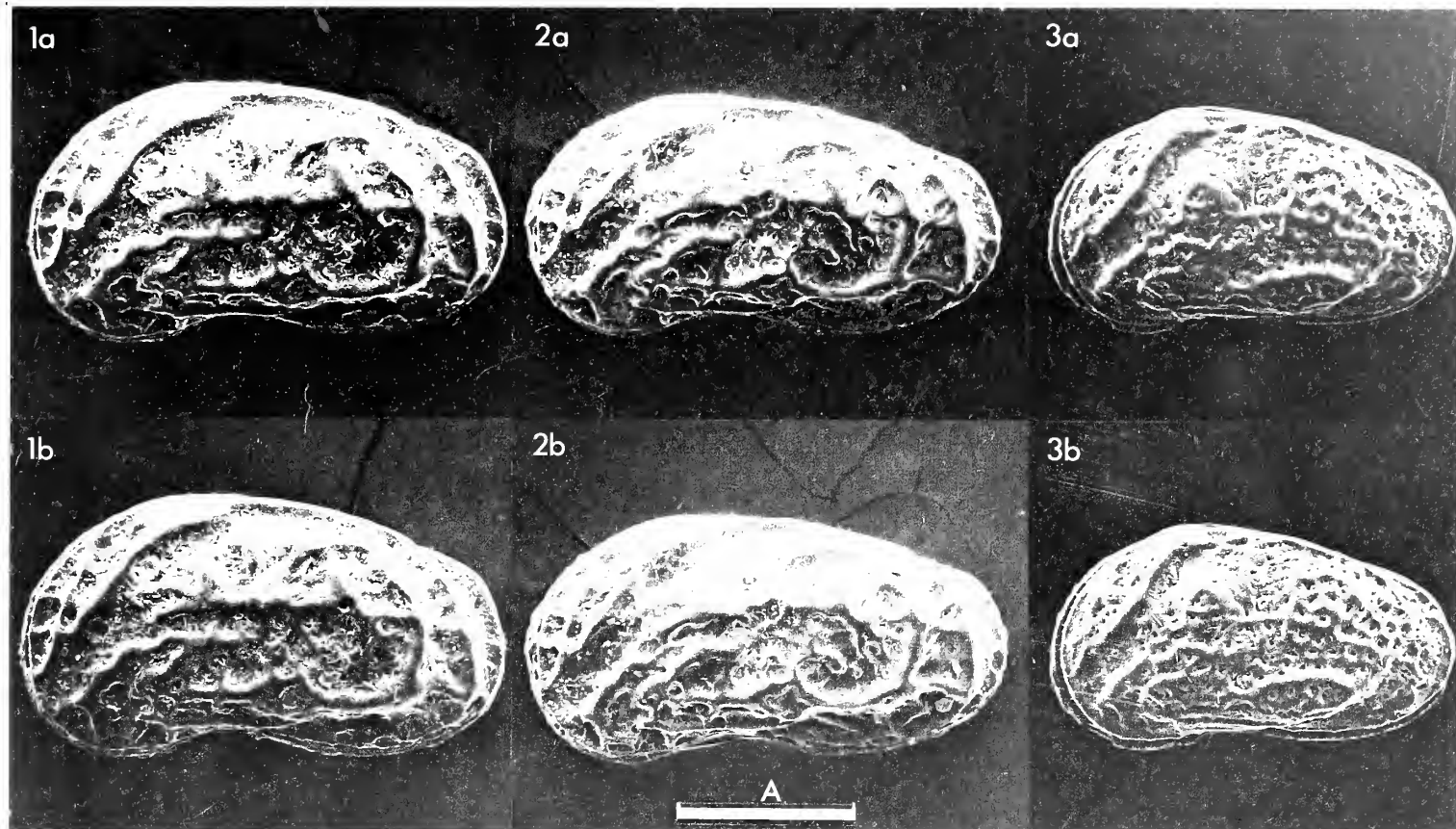
Scale A (200 µm; x 130), figs. 1 - 3.

Figured specimens: Brit. Mus. (Nat. Hist.) nos. 1977.45 (holotype, ♀ car.: Pl. 5, 146, fig. 1), 1977.46 (♂ car.: Pl. 5, 146, fig. 2), 1977.47 (juv -1 car.: Pl. 5, 146, fig. 3), 1977.48 (♀ car.: Pl. 5, 148, fig. 1), 1977.49 (♀ car.: Pl. 5, 148, fig. 2), 1977.50 (♂ car.: Pl. 5, 148, fig. 3), 1977.51 (♀ car.: Pl. 5, 148, fig. 4), 1977.52 (♂ car.: Pl. 5, 148, fig. 5), 1977.53 (♂ LV: Pl. 5, 150, fig. 1; Pl. 5, 152, figs. 1, 3, 6), 1977.54 (♀ RV and soft parts: Pl. 5, 150, fig. 2), 1977.55 (♂ RV and soft parts: Pl. 5, 150, fig. 3, Text-fig. 1), 1977.56 (♀ RV: Pl. 5, 152, figs. 2, 4, 5).1977.45 - 47, 49, 50, 54 - 56 collected alive from *Fucus ceranoides* with epiphytes at the type locality by J.E. Whittaker, 5th August 1969; salinity 7.4‰, water temperature 21.8°C. 1977.48, 51 - 53 collected by J.W. Murray from sediment with green algae, 7th January 1960, at same locality; salinity 0.8‰, water temperature 4.5°C.

Explanation of Plate 5, 148

Fig. 1, ♀ car., ext. rt. lat. (paratype, 1977.48, 500 µm long); fig. 2, ♀ car., ext. dors. (paratype, 1977.49, 500 µm long); fig. 3, ♂ car., ext. dors. (1977.50, 490 µm long); fig. 4, ♀ car., ext. vent. (paratype, 1977.51, 510 µm long); fig. 5, ♂ car., ext. vent. (paratype, 1977.52, 500 µm long).

Scale A (200 µm; x 130), fig. 1; scale B (200 µm; x 120).



Remarks: The present species has been compared with a great number of Recent European members of the genus, particularly from the Mediterranean, (colls. of J. Athersuch, G.S. Brady, A.M. Norman, G.W. Müller, G. Ruggieri and K. Wouters) and is found to be new.

Distribution: *C. murrayi* sp. nov. is known so far only from the type locality and from a few other tidal creeks in the British Isles: Cresswell River at West Williamston, Dyfed, SW Wales (collected by J.E. Robinson), and the following East Anglian localities: River Bure and Breydon Water, near Yarmouth, Norfolk; River Stour at Manningtree, Essex; and Lothing Creek, Mutford, Suffolk (all from Brady Coll., Hancock Mus., Newcastle-upon-Tyne, respectively faunal slide nos. U, W₁, Y and F₁). Associated fauna in all cases includes *Cyprideis torosa* (Jones), *Elofsonia baltica* (Hirschmann), *Loxoconcha elliptica* Brady, *Cytherura gibba* (O.F. Müller), *Leptocythere ilyophila* (Hirschmann), *L. lacertosa* (Hirschmann) and/or *L. castanea* (Sars). Such an exclusively brackish habitat for a species of *Callistocythere* appears to be rare, and is, as far as I am aware, the first so far reported from European waters. Whatley & Moguilevsky (1975: *Bull. Am. Paleont.*, 65, 509), however, cite a number of examples in their discussion on the distribution and ecology of Argentinian Leptocytheridae.

Explanation of Plate 5, 150

Fig. 1, ♂ LV, int. lat. (paratype, 1977.53, 490 μ m long); fig. 2, ♀ RV, int. lat. (paratype, 1977.54, 500 μ m long) showing soft parts; fig. 3, ♂ RV, int. lat. (paratype, 1977.55, 490 μ m long) showing soft parts.

Scale A (200 μ m; x 120), figs. 1 - 3.



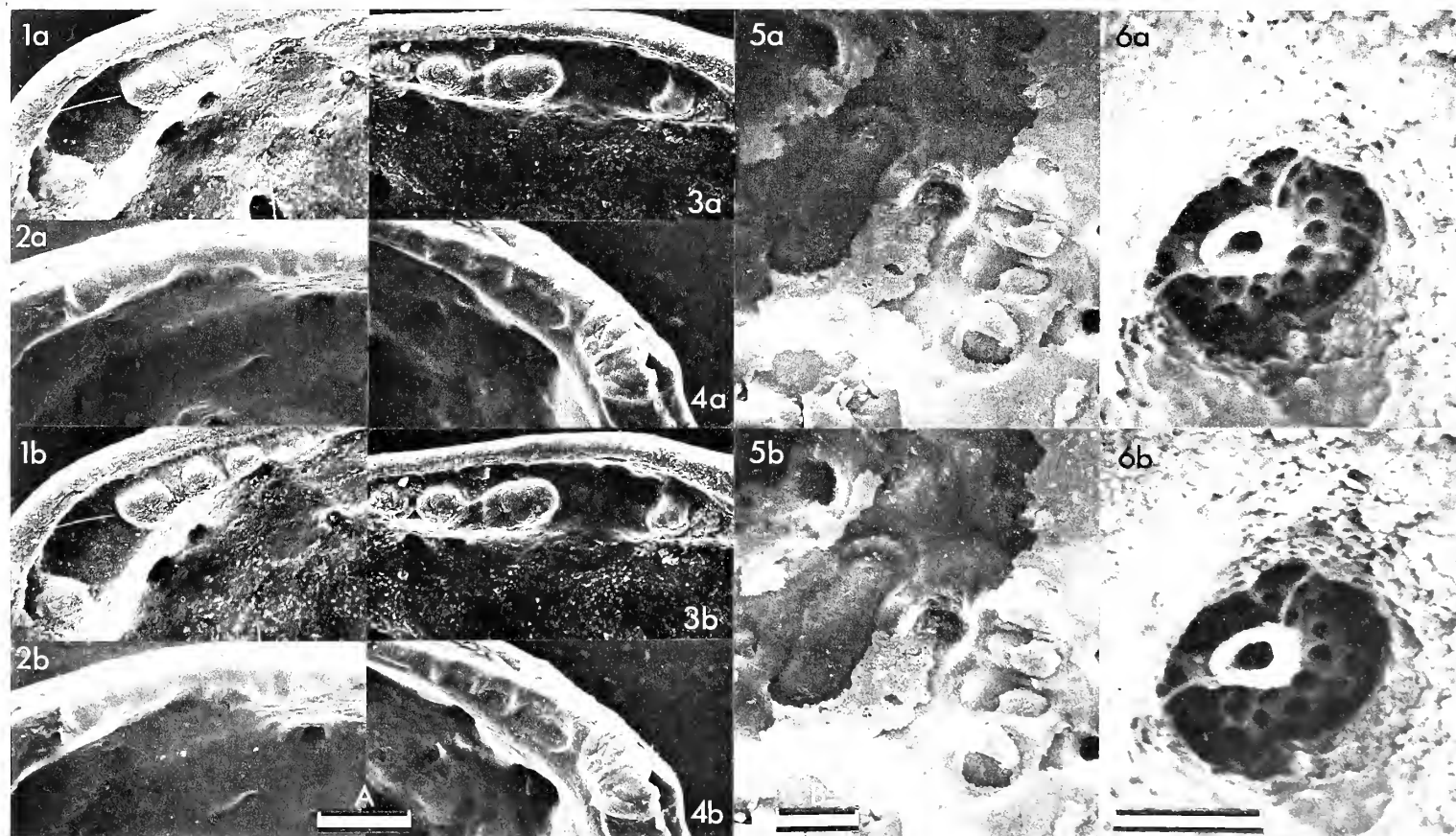
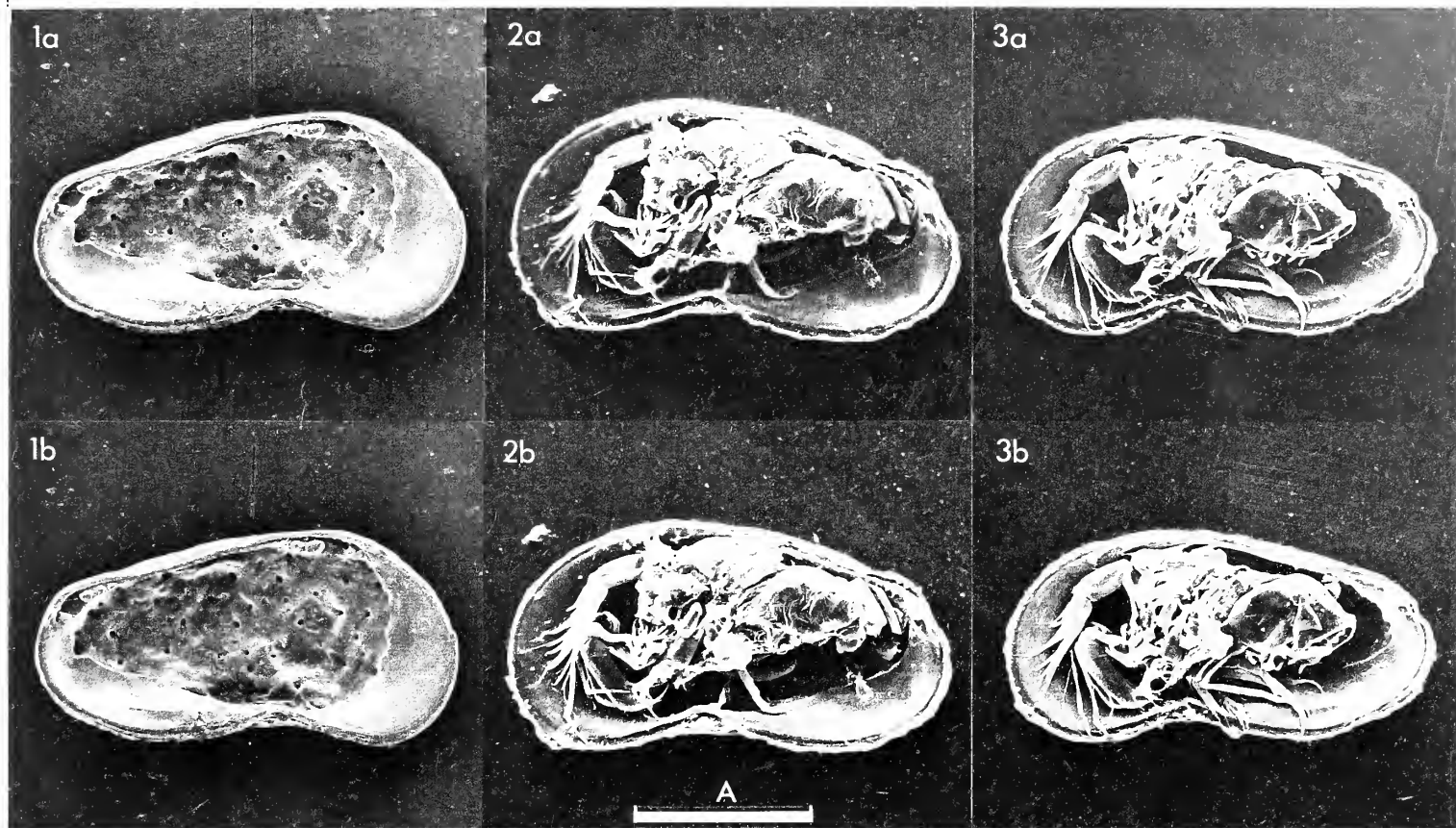
Text-fig. 1, ♂ rt. copulatory appendage (x 415; 1977.55). (Drawing kindly provided by Dr. J. Athersuch). (Scale = 50 μ m).



Explanation of Plate 5, 152

Figs. 1, 3, 6, ♂ LV, int. lat. (paratype, 1977.53, 490 μ m long): fig. 1, post. hinge, fig. 3, ant. hinge; fig. 6, int. view of pore (mid region) showing sieve plate. Figs. 2, 4, 5, ♀ RV, int. lat. (paratype, 1977.56, 190 μ m long): fig. 2, ant. hinge; fig. 4, post. hinge; fig. 5, musc. sc.

Scale A (50 μ m; x 350), figs. 1 - 4; scale B (25 μ m; x 450), fig. 5; scale C (5 μ m; x 4,000), fig. 6.



Tetradella egorowi Neckaja; 57 - 60

Tetradella pentaloculata Schallreuter sp. nov.; 65 - 72

Tetradella separata Sidaravičiene; 61 - 64

Tetradella? triloculata Schallreuter sp. nov.; 73 - 80

triloculata, *Tetradella?*; 73 - 80

Whatley, R., Frame, P. & Whittaker, J.E., On *Rockallia enigmatica* Whatley, Frame & Whittaker sp. nov.; 137 - 144

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Whittaker, J.E., On *Xestoleberis aurantia* (Baird); 27 - 34

Whittaker, J.E., On *Xestoleberis nitida* (Liljeborg); 17 - 26

Whittaker, J.E., On *Xestoleberis rubens* Whittaker sp. nov.; 35 - 44

Whittaker, J.E., Whatley, R. & Frame, P., On *Rockallia enigmatica* Whatley, Frame & Whittaker sp. nov.; 137 - 144

Xestoleberis aurantia (Baird); 27 - 34

Xestoleberis nitida (Liljeborg); 17 - 26

Xestoleberis rubens Whittaker sp. nov.; 35 - 44

Index; Geological Horizon

See 1 (2) 5 - 22 (1973) for explanation of the Schedules in the Universal Decimal Classification.

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<i>Phalcoocythere horrescens</i> ; 117 - 120 |
| (113.313) | Upper Ordovician:
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<i>Tetradella? triloculata</i> ; 73 - 80 | (118.213) | Tortonian:
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| (116.311) | Berriasian:
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Index; Geographical Location

See 1 (2) 5 - 22 (1973) for explanation of the Schedules in the Universal Decimal Classification.

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<i>Tetradella separata</i> ; 61 - 64
<i>Tetradella? triloculata</i> ; 73 - 80 |
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